

REVIEW OF SPECIES PREVIOUSLY REFERRED TO *CERATONEREIS MIRABILIS*, AND DESCRIPTIONS OF NEW SPECIES OF *CERATONEREIS*, *NEPHTYS*, AND *GONIADA* (POLYCHAETA)

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Abstract.—*Ceratonereis tentaculata* Kinberg, *C. excisa* (Grube), and *C. singularis* Treadwell, previously referred to *C. mirabilis* Kinberg, are retained. *Nephtys magellanica* Augener is redescribed. *Ceratonereis longicirrata*, *Nephtys simoni*, and *Goniada multidentopsis*, n. spp. from Florida and nearby areas are described. A key is provided for species similar to *Ceratonereis mirabilis*.

Introduction

The present paper is one of a series of several reports in progress based primarily on specimens collected between September 1971 and July 1973 in an environmental baseline study of marine biota near the Florida Power and Light nuclear power plant at Hutchinson Island, St. Lucie County, Florida. Additional specimens from nearby areas were examined. The study area and methods and materials were described by Gallagher and Hollinger (1977). Sediments were described by Gallagher (1977), and other aspects of the physical and chemical environment were reported by Worth and Hollinger (1977). Brief descriptions of benthic sampling stations and methods were also given by Perkins (1979).

In addition to specimens deposited in the Invertebrate Reference Collection of the Florida Department of Natural Resources Marine Research Laboratory (FSBC I), additional specimens were borrowed from the following institutions: Allan Hancock Foundation, University of Southern California, through K. Fauchald (AHF); American Museum of Natural History, through H. S. Feinberg (AMNH); Dauphin Island Sea Laboratory, Dauphin Island, Alabama, through T. S. Hopkins (DISL); Harbor Branch Foundation/Smithsonian Institution, Ft. Pierce Bureau, Fort Pierce, Florida, through R. H. Gore and J. E. Miller (SIFP); Museum of Comparative Zoology, Harvard University, through H. W. Levi (MCZ); National Museum of Natural History, Smithsonian Institution, through M. H. Pettibone, M. L. Jones, and K. Fauchald (USNM); Naturhistoriska Riksmuseet, Stockholm, through R. Oleröd (NRS); Zoologisches Museum für Naturkunde der Humboldt-Universität zu Berlin, through G. Hartwich (ZMB); and Zoologisches Museum,

Hamburg, through G. Hartmann-Schröder (ZMH). Additional specimens were donated by R. G. Ernest, Applied Biology, Inc., Jensen Beach, Florida. J. L. Simon, University of South Florida, and K. Fauchald commented on early drafts of the manuscript. M. H. Pettibone provided information and copies of papers not available to me and critically reviewed the manuscript. Many individuals from the Marine Research Laboratory and Applied Biology, Inc., participated in the Hutchinson Island study, for which Florida Power and Light Co., provided partial funding.

Nereididae Johnston
Ceratonereis Kinberg

Type-species.—*Ceratonereis mirabilis* Kinberg, 1866, designated by Hartman (1948:70).

In addition to the generic diagnosis provided by Fauchald (1977a: 88), the type-species and similar species reported herein have an anteriorly cleft prostomium, and all, except possibly one, have soft, cushion-shaped lobes on area VI of the proboscis [see Fauchald (1977a: Fig. 21c, d) for diagram of nereidid pharyngeal areas]. *C. japonica* Imajima (1972: 69–71, Figs. 15o–p) is provisionally included in the group, but differs in having paragnaths on area I of the proboscis and probably does not have soft lobes on area VI. Most other species presently included in the genus have an anteriorly rounded prostomium, with no mention of soft lobes on area VI. Characters noted above for the latter group of species may provide the basis for a new genus or subgenus.

Species redescribed herein have been referred by various authorities to *Ceratonereis mirabilis* Kinberg, 1866. Ehlers (1887:120) suggested the possible synonymy of *C. mirabilis*, *C. tentaculata* Kinberg, 1866, and *Nereis excisa* Grube, 1874. Augener (1913:168), who examined the type-specimens of *C. mirabilis* and *C. tentaculata*, referred the above three species to *Nereis* (*Ceratonereis*) *tentaculata*. Fauvel (1917:207) placed *C. tentaculata* under *C. mirabilis*. *Nereis gracilis* Webster, 1884 [HOMONYM, not Hansen, 1882], was referred to *C. mirabilis* by Treadwell (1901:193); however, he later used *N. gracilis* for specimens from Barbados (Treadwell, 1924:13). Hartman (1940:218) referred *C. singularis* Treadwell, 1929, to *C. tentaculata* and later, in her report on Kinberg's types (Hartman, 1948:70), to *C. mirabilis*. Since Hartman's (1948) account, *Ceratonereis mirabilis* has generally been used to include all the above-mentioned species, and the group was considered to be one widely distributed, cosmopolitan species.

Examination of type-specimens of the above taxa indicates that there are distinct differences among them. In the case of *N. gracilis*, differences are considered to be of less importance, and the synonymy of *N. gracilis* Web-

ster and *C. mirabilis* is maintained. The remainder are considered to be distinct species.

Characters of importance in distinguishing atokous members of this group are: 1) body dimensions; 2) development of parapodial lobes along the body; 3) shape and possibly number of falcigers in the three bundles (notopodial, upper and lower neuropodial); 4) stoutness, length, and possibly number of stiff hairs on the blades of compound falcigers; and 5) gross differences in the number, arrangement, and size of paragnaths on the proboscis. Differences in both male and female heteronereidid stages of these animals are also of systematic importance. Such differences occur in differential modification of the prostomium and anterior segments; in the specific segment on which the epitokous parapodia begin; the shape of epitokous parapodia; the shape and number of parapodia of the "tail" region, if there is one; and differences in modification of the pygidium [see Pettibone, 1956, for detailed descriptions of heteronereidids]. These characters are consistent on specimens I examined from Florida and the Caribbean area, and should be applicable to specimens from other areas as well.

Many citations to specimens of *C. mirabilis* and *C. tentaculata*, for which I have not examined voucher specimens, include only short descriptions, but a few are sufficiently described to indicate that the specimens do not belong to the species treated in this paper. Further, some specimens from areas other than the western Atlantic and referred to the above-mentioned species were examined and also found to be different. These are not included in the synonymies, but some are discussed in the remarks under certain of the species.

KEY TO ATOKOUS ADULTS OF SPECIES SIMILAR TO
CERATONEREIS MIRABILIS

1. Blades of upper neuropodial falcigers of middle and posterior segments massive, with very stout, stiff subdistal hairs (Figs. 13e, f) *Ceratonereis* sp.
– Blades of falcigers moderately stout, with moderately stout, stiff hairs (Figs. 1c–f; 10) 2
2. Upper notopodial ligules absent from posterior parapodia (Figs. 6e, f) 3
– Upper notopodial ligules present on posterior parapodia but often reduced to small papillae (Figs. 2a, b) 5
3. Proboscis with paragnaths on area I; separated into 3 groups on area III [not covered in this report; see remarks above] *C. japonica*
– Proboscis with paragnaths absent on area I; single group on area III 4

4. Blades of falcigers of middle and posterior segments unidentate (Figs. 6g–k); dorsal cirri about as long as segmental width or slightly shorter (Figs. 6b–f) *C. excisa*
- Blades of falcigers of middle and posterior segments bidentate (Figs. 12a–e); dorsal cirri longer than segmental width (Figs. 11b–e) *C. longicirrata*, n. sp.
5. Blades of all falcigers of middle and posterior segments unidentate, distal tips evenly rounded to slightly concave (Fig. 10) .. *C. singularis*
- Blades of notopodial and upper neuropodial falcigers of middle and posterior segments bidentate (Figs. 1c–f); blades of lower neuropodial falcigers bidentate to unidentate, latter with distal tips concave to convex **6**
6. Eyes large; upper and lower notopodial ligules subequal throughout body (Figs. 5a, b); blades of lower neuropodial falcigers with distal tips bidentate above (Fig. 5k) to evenly rounded below *C. tentaculata*
- Eyes of average size; upper notopodial ligules about half as long as lower ligules on middle parapodia (Fig. 2a), reduced to papillae and much shorter than lower ligules on posterior parapodia (Fig. 2b); blades of lower neuropodial falcigers with distal tips bidentate above to slightly concave below (Figs. 4c–e) *C. mirabilis*

Ceratonereis mirabilis Kinberg

Figs. 1–4

Ceratonereis mirabilis Kinberg, 1866:170.—Ehlers, 1887:117–120 [in part, specimen from *Blake* Sta. 11; description and figures = *C. singularis* Treadwell, 1929].—Hartman, 1948:71, 72 [in part].

Nereis gracilis Webster, 1884:313–314, Pl. 9, Figs. 29–35 [HOMONYM, not Hansen, 1882].—Treadwell, 1924:13 [in part, specimen from Sta. 99].

Nereis (Ceratonereis) tentaculata.—Augener, 1913:168–171 [in part].

Ceratonereis versipedata.—Vittor, 1975:79.—Vittor and Johnson, 1977:167 [in part; not Ehlers, 1887].

Material examined.—BRAZIL: 09°S, 33 m, Werngren, col., 2 syntypes of *C. mirabilis* (NRS 456). BERMUDA: G. B. Goode, col., 1876–77, anterior fragments of 2 syntypes of *Nereis gracilis* (USNM 4787). BAHAMAS: S portion of Bimini Lagoon, 25°43'N, 79°16'W, in plastic sponges submerged behind reef, A. Schoener, col., 1970–71, 5 specimens (USNM 54330); Hydro-Lab, Freeport, 26°30'N, 78°38'W, 16 m, on coral, B. A. Vittor and T. S. Hopkins, cols., 28 Jan. 1974, 1 specimen (DISL); Cherokee Sound, Abaco Island, 26°N, 77°W, in plastic sponges submerged behind reef, A. Schoener, col., 1972, 8 specimens (USNM 51683). FLORIDA, AT-

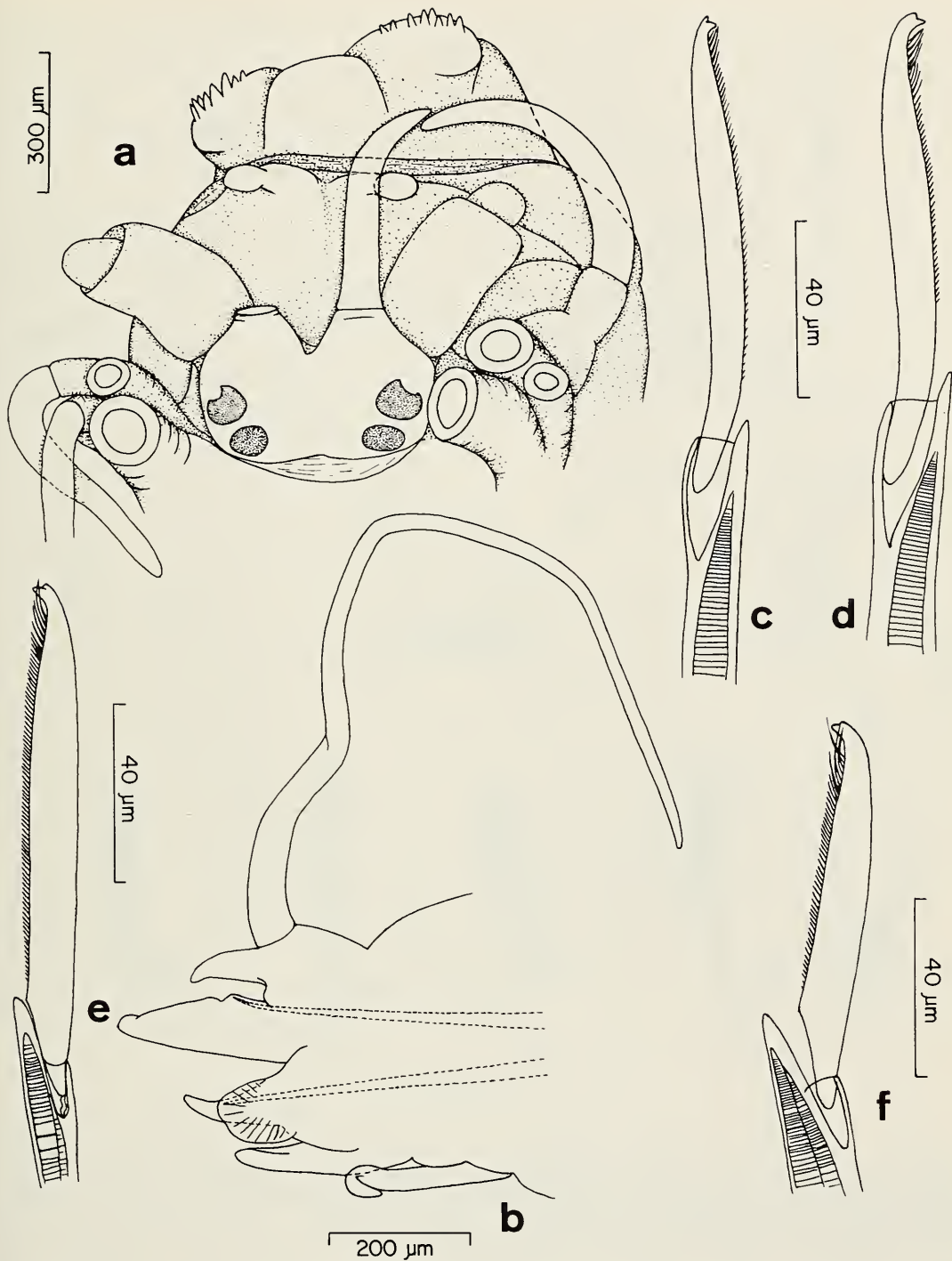


Fig. 1. *Ceratoneris mirabilis*, syntypes: **a**, Anterior end with pharynx extended; **b**, Parapodium from first setiger of middle fragment, posterior view; **c,d**, Notopodial falcigers from same; **e,f**, Upper neuropodial falcigers from posterior segments of middle fragment.

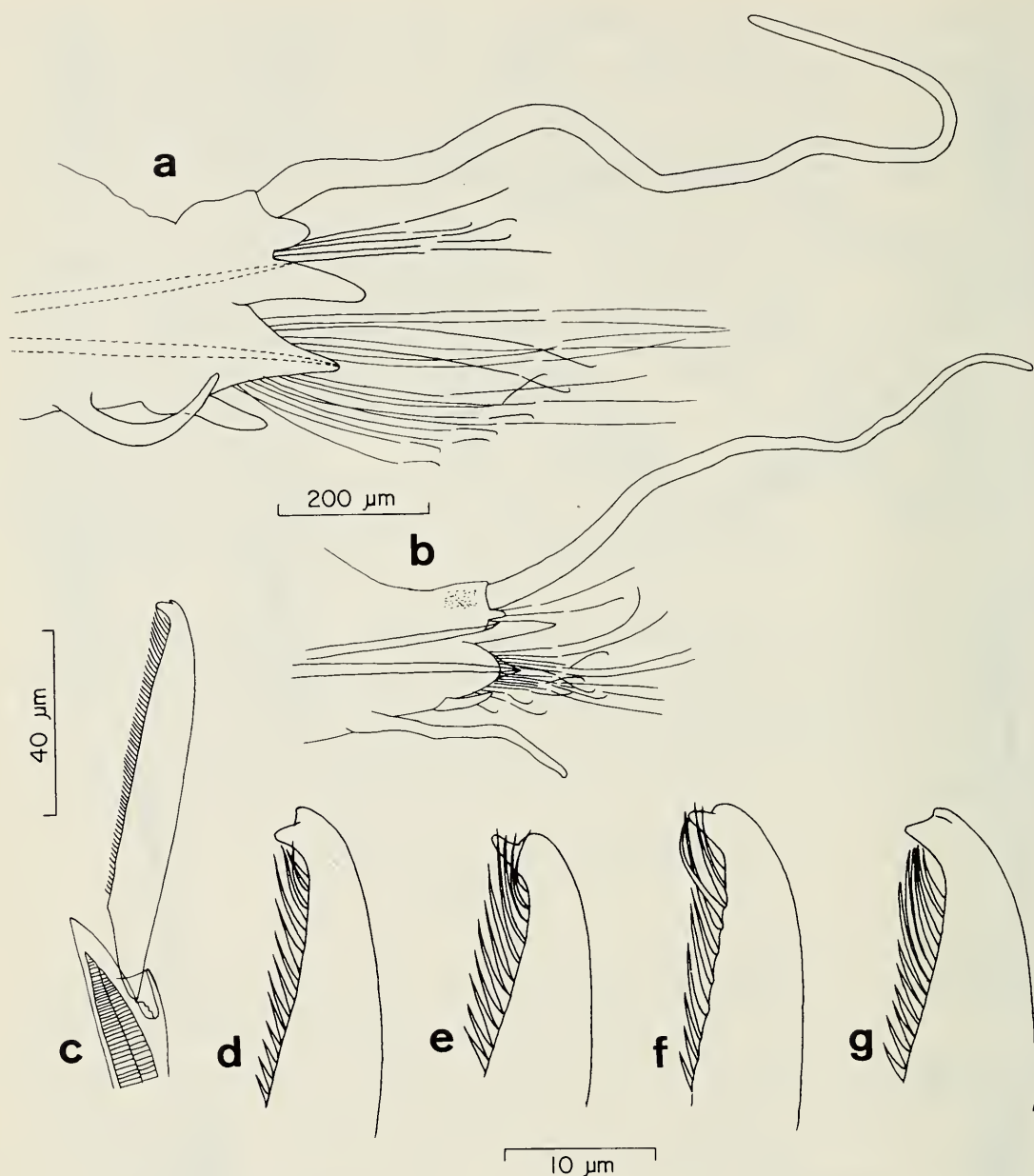


Fig. 2. *Ceratonereis mirabilis*, syntypes: **a**, Parapodium from setiger 25 of anterior fragment, anterior view; **b**, Posterior parapodium, from posterior fragment, posterior view; **c**, Lower neuropodial falciger from same; **d,e**, Tips of notopodial falcigers; **f**, Tip of upper neuropodial falciger; **g**, Tip of lower neuropodial falciger.

LANTIC COAST: Palm Beach, 0.5–0.75 mi off Breakers Hotel, “Breakers Reef,” 26°42.8’N, 80°01.2’W, 13.7 m, in carbonate rock, J. W. Smith et al., cols., 3 Mar. 1976, 1 specimen (FSBC I 18980). FLORIDA, GULF OF MEXICO: Florida Middle Ground, 28°35.0’N, 84°14.9’W, 31 m, on coral, R. Matchok, col., 19 May 1977, 1 specimen (FSBC I 18981); 24°43’N, 83°25’W, 68 m; U.S. Coast Survey steamer *Blake* Sta. 11, 1877–78, 1 ato-

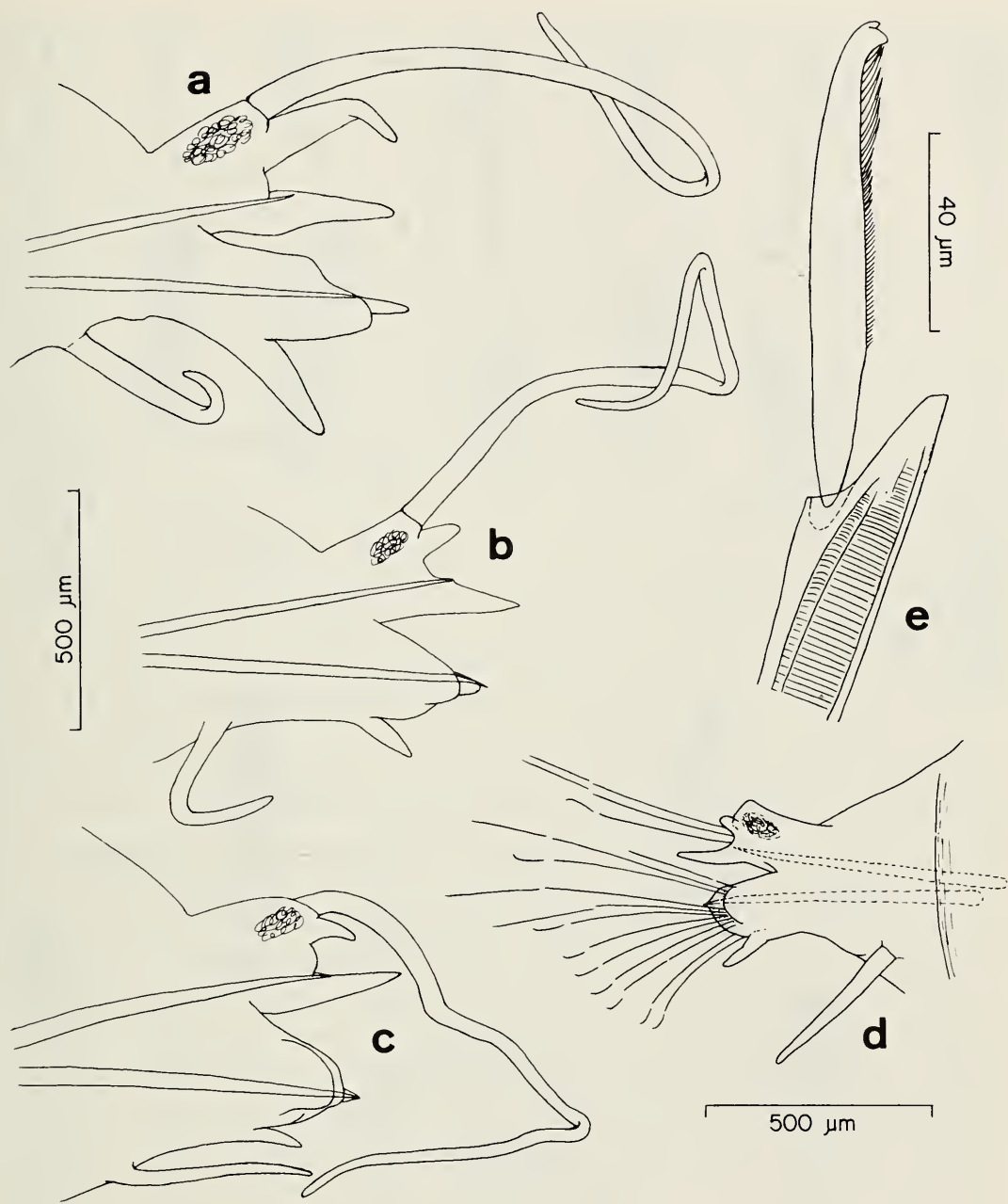


Fig. 3. *Ceratonereis mirabilis*: a, Parapodium from setiger 9, posterior view; b, Same from setiger 27, posterior view; c, Parapodium from setiger 40, posterior view; d, 7th parapodium from pygidium, posterior view, style of dorsal cirrus missing; e, Upper neuropodial falciger from middle segment (a,b, FSBC I 18981; c, MCZ 763; d, FSBC I 18980; e, syntype of *Nereis gracilis*, USNM 4787).

kous male (MCZ 763). PUERTO RICO: Aquadilla, 15 m, N. Hulings and D. Feray, cols., Aug. 1963, 1 juvenile (USNM 42765); Barceloneta, EPA Oceanogr. Study, B. S. Mayo, col., 18°29'57"N, 66°30'50"W, consolidated bottom, Cr. 1, Sta. 6H-1A, 1D, 1E, 1 Aug. 1977, 2 juveniles (USNM 52305);

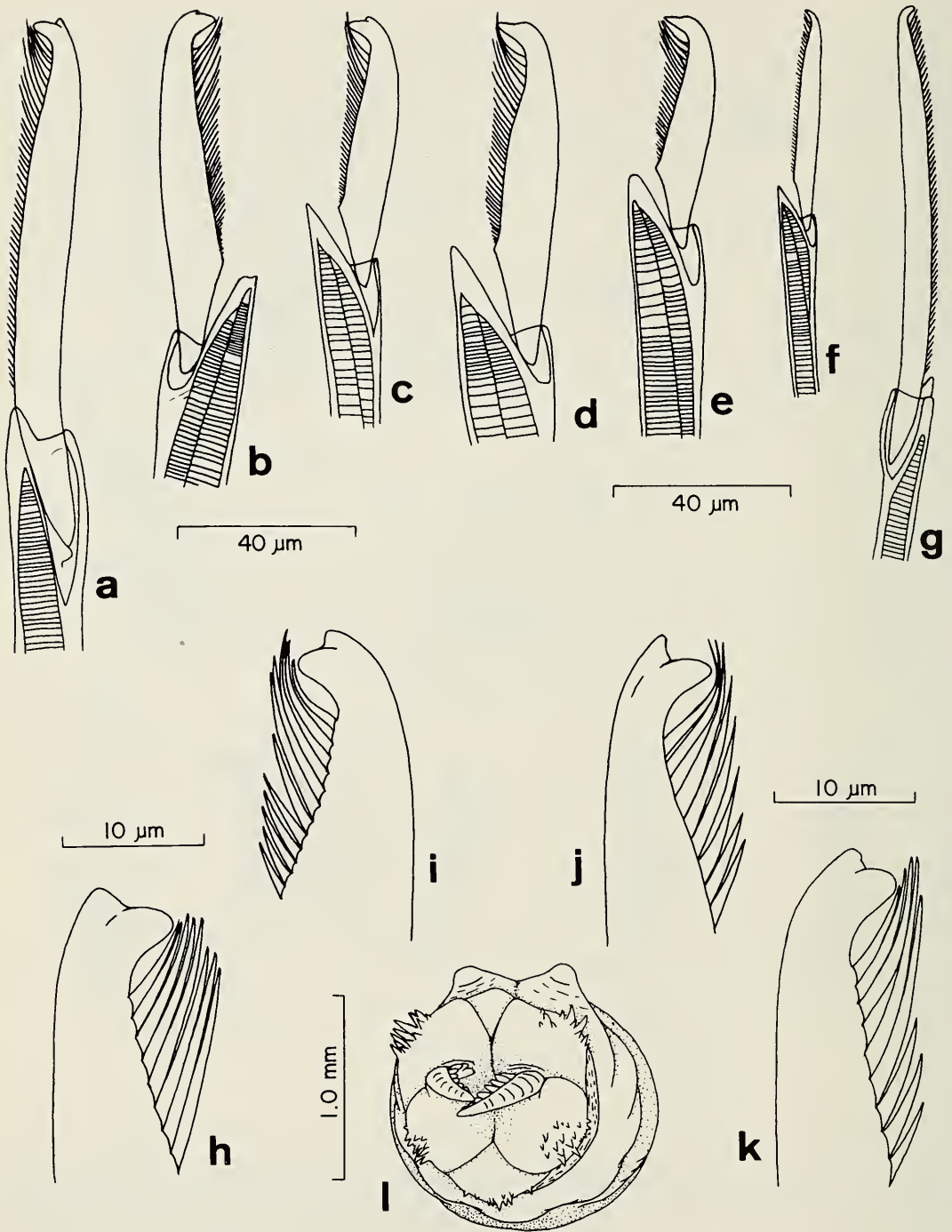


Fig. 4. *Ceratonereis mirabilis*: a, Notopodial falciger from setiger 36; b, Upper neuropodial falciger from posterior setiger; c, Lower neuropodial falciger from setiger 36; d, Ventralmost lower neuropodial falciger from same; e, Same from posterior setiger; f, slender, lower neuropodial falciger from same; g, Slender notopodial falciger from same; h-j, Notopodial falcigers from middle setigers; k, Upper neuropodial falciger from middle setiger; l, Proboscis, frontal view (a-h, j, k, FSBC I 18980; i, USNM 52306; l, FSBC I 18981).

same, 18°30'03"N, 66°34'41"W, 12–15 m, hard bottom, Cr. 1, Sta. 6E-1A, 11 Aug. 1974, 1 adult, 2 juveniles (USNM 52306); same, 18°30'03"N, 66°34'41"W, 20 m, hard bottom, Cr. 3, Sta. 6E-3B, 11 Nov. 1974, 1 damaged specimen (USNM 52307). BARBADOS: Barbados-Antigua Expedition, Univ. Iowa, 1918, Sta. 99, 1 specimen (USNM 20313).

Description.—Two syntypes of *C. mirabilis* consisting of anterior fragment of 50 setigers, 13 mm long, 0.9 mm wide without parapodia, 1.7 mm wide including parapodia, gradually decreasing in width after first several segments; middle fragment of 20 setigers (gravid, slightly modified male, not same specimen as anterior fragment) 7 mm long, 2 mm wide including parapodia; pygidial fragment of 25 segments (gravid male, apparently same specimen as middle fragment) 7 mm long. Complete but immature Florida specimen of 75 segments (FSBC I 18980) 40 mm long, 3 mm wide including parapodia. Syntypes colorless; recently collected specimens with reddish-orange to brown pigment on prostomium and tentacular segment, and in 2 transverse bands across dorsum of anterior segments; anterior segmental bands extending in straight line from upper parts of parapodial lobes; posterior bands near segmental grooves; highly colored specimens light orange between segmental bands. Prostomium (Fig. 1a) about twice as wide as long, anteriorly incised to near level of anterior eyes, laterally rounded, slightly incised posteriorly; eyes with lenses, in trapezoidal arrangement open to front, anterior pair slightly larger. Antennae and palps slightly longer than prostomial width; antennae cirriform; palps with cylindrical palpophores and spherical to oblong palpostyles. Tentacular segment similar in length and width to following segment; tentacular cirri very long, longest extending to setiger 10–15. Notopodia of setigers 1 and 2 with dorsal cirri, single ligules and slender acicula; neuropodia similar to those of following segments. Following parapodia biramous (Figs. 1b, 2a, b, 3a–d). Length of dorsal cirri behind first few segments equal to body width without parapodia or more. Upper notopodial ligules of anterior segments longer than all other parapodial lobes, slightly longer than lower notopodial ligules (Fig. 3a), reduced to half length of lower notopodial ligules by setiger 15–25 (Fig. 3b), gradually reduced to small papillae on posterior segments, apparently absent from much of posterior half of juveniles (USNM 52305, 52306). Lower notopodial ligules long on anterior segments, slightly reduced in length on posterior segments proportionately to reduction of parapodial size. Neuropodial presetal lobes [conical ligules below acicula on acicular lobes] relatively long, slender on anterior parapodia, tips extending past tips of acicula on lower side, reduced to acicular lobes by setiger 25–35. Postsetal lobes of anterior segments foliaceous, reduced to obscure, rounded lobes on posterior segments, tips subtriangular to rounded. Neuropodial ligules of anterior segments long, extending to about acicular tips, slightly reduced in length

posteriorly proportionate to reduction of parapodial size. Ventral cirri of anterior segments extending about to tips of lower neuropodial ligules, longer than all other parapodial lobes on posterior parapodia of type of *C. mirabilis* (Fig. 2b), relatively long on posterior parapodia of mature specimen from Gulf of Mexico (MCZ 763, Fig. 3c), shorter on immature specimen from Palm Beach (Fig. 3d). Glandular regions in bases of dorsal cirrophores except on Palm Beach specimen, which has them in addition in upper and lower notopodial ligules and lower neuropodial ligules of anterior parapodia. Notopodia with sesquigomph spinigers beginning on setiger 3, joined by long-bladed sesquigomph falcigers (Figs. 1c, d, 4a) beginning on setiger 15–16; blades of falcigers with broadly bifid tips (Figs. 2d, e, 4h, i), stiff hairs on edge short proximally, gradually longer distally, usually not extending past tips; 3 falcigers, 2–6 spinigers on setiger 25; 1 falciger, 1–2 spinigers on posterior setigers; falcigers with shafts similar to spinigers and blades similar to those of anterior neuropodial falcigers on few posterior segments of immature Palm Beach specimen (Fig. 4g; FSBC I 18980) and on much of posterior halves of juveniles (USNM 52305, 52306). Upper neurosetae consisting of posterior row of sesquigomph spinigers and anterior group of long-bladed heterogomph falcigers; blades of falcigers of anterior setigers with evenly rounded, unidentate tips; blades shorter than those of notopodial falcigers on middle and posterior segments (Figs. 1e, f, 2f, 3e, 4b, k) with tips similar but stouter, with stiff hairs similar but usually extending slightly past tips; 2–3 falcigers, 5–6 spinigers on setiger 25; 1–2 falcigers, 3–6 spinigers on posterior segments. Lower neurosetae heterogomph spinigers and falcigers; blades of falcigers of anterior setigers similar to those of upper neuropodial falcigers; blades of falcigers of middle and posterior segments (Figs. 2g, 4c–e) usually shorter than upper neuropodial falcigers, tips broadly bidentate above to unidentate and concave below on outer edges, usually with longer stiff hairs basally; 6–8 falcigers, 5 spinigers on setiger 25; 5–7 falcigers, 1–3 spinigers on posterior parapodia. Lower bundles of posterior few setigers of Palm Beach specimen with few small falcigers having blades similar to those of anterior segments (Fig. 4f). Acicula pale on all type-specimens and some other specimens, brown on tips in anterior and middle parapodia of additional specimens. Transverse rows of obscure ciliary tufts on dorsum of posterior segments of relatively large but immature Palm Beach specimen and some juvenile specimens.

Possible developing heteronereidids: middle and posterior fragments of male syntype of *C. mirabilis* with slightly modified heteronereidid parapodia (Fig. 1b), without natatory setae, with notopodial falcigers in addition to spinigers on anterior parapodia; atokous male anterior fragment from *Blake* Sta. 11 without sexually modified parapodia (Fig. 3c).

Proboscis (Figs. 1a, 4l): area I, 0 paragnaths; II, 8–14; III, 7–11; IV, 8–14; V, reduced; VI, soft, cushion-shaped lobe; VII–VIII, without structures.

Paragnaths on areas II and IV relatively large, covering oval area; cones on area III smaller, covering smaller area. Jaws amber, mostly dark on convex sides near tips, with 5–7 teeth.

Remarks.—The original description of *C. mirabilis* was very brief and lacked most important characters. Type-specimens of both *C. mirabilis* from Brazil and *C. tentaculata* from Hawaii were examined by Augener (1913:168–171), who stated that there were no important differences between them. Both are considered herein to be distinct species and separable as indicated in the key. Hartman (1948:71,72) also examined the types of both species and considered them synonymous. She briefly supplemented Kinberg's description of *C. mirabilis* but incorrectly stated that paragnaths were present on area I of the proboscis and incorrectly reported the number of paragnaths on other areas. The lower numbers of paragnaths in the ranges given above are from a syntype of *C. mirabilis*.

Notopodial falcigers on the anteriormost remaining segments of the syntype, comprised of middle and posterior fragments, indicate that the specimen originally had at least 15 more anterior segments. The missing segments were probably longer and wider than those remaining, suggesting that the specimen was at least 20 mm (but less than 30 mm) long, 2 mm wide, and consisted of at least 60 setigers.

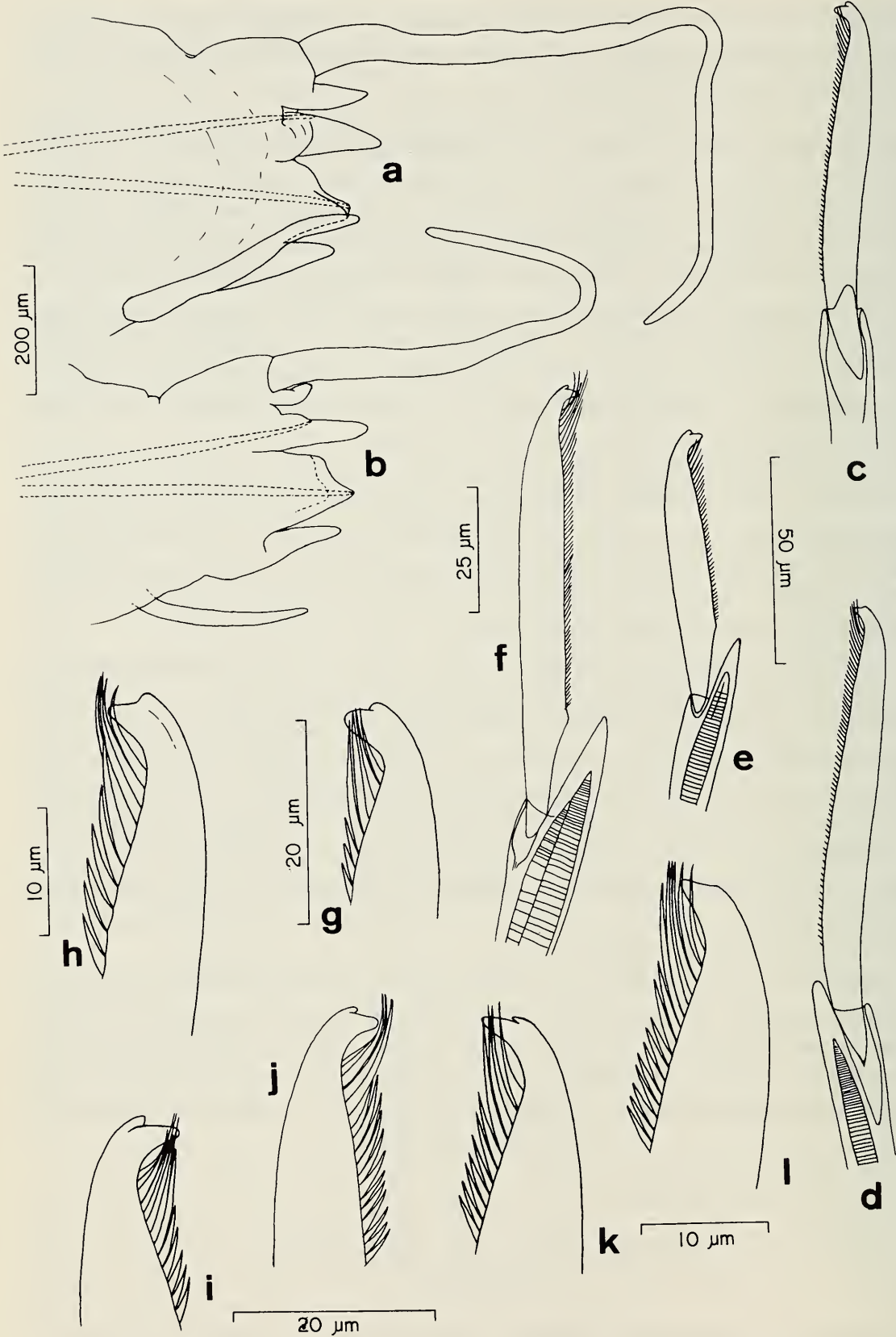
Available syntypes of *Nereis gracilis* consist only of two anterior fragments. (A complete specimen 60 mm long and 4.5 mm wide consisted of 92 segments, according to Webster, 1884). They are about twice as wide as the syntypes of *C. mirabilis*, and there is a corresponding increase in the size of setae and the number of paragnaths on the proboscis. As on *C. mirabilis*, ventral cirri of anterior segments extend about to the tips of lower neuropodial ligules and are longer than all the other parapodial lobes on posterior parapodia, as figured by Webster (1884:Pl. 9, Fig. 32). Because other aspects of the parapodia are also similar, *C. mirabilis* and *N. gracilis* are here considered to be synonyms.

Records of *N. gracilis*, *C. mirabilis*, and *C. tentaculata* from the Gulf of Mexico and the Caribbean area, cited in Perkins and Savage (1975:32–34), may have included specimens of other species. The specimen reported as *C. mirabilis* by Renaud (1956:17, 18) from Key West may be different from any species that I have examined, since it was described and figured as having paragnaths on area I of the proboscis.

Ceratonereis tentaculata Kinberg

Fig. 5

Ceratonereis tentaculata Kinberg, 1866:170; 1910:51, Pl. 20, Fig. 5b–g.
Nereis (Ceratonereis) tentaculata.—Augener, 1913:168–171 [in part].



Ceratonereis mirabilis.—Hartman, 1948:71, 72 [in part].—Imajima, 1972:64–66 [in part], Figs. 13a–j, l, n, p–s [not Kinberg, 1866].

Material examined.—HAWAII: Honolulu, Oahu, outside of port, 18 m, among green and brown algae, *Eugenie* Expedition 1851–53, 2 syntypes (NRS 542).

Description.—Anterior fragment of 9 setigers from larger syntype, with proboscis everted, 3 mm long, 2 mm wide including parapodia; middle fragment of 19 setigers from same specimen 5 mm long, 2 mm wide including parapodia; anterior fragment of 30 setigers from smaller syntype 6.5 mm long, 1.8 mm wide including parapodia; posterior fragment of 9 setigers 2.6 mm long, 1.4 mm wide including parapodia. Colorless in alcohol. Prostomium of small syntype, with proboscis withdrawn, about as long as wide, almost twice wider than long on larger syntype with proboscis everted; prostomium anteriorly incised to near level of anterior eyes, laterally rounded, posteriorly straight or slightly concave. Eyes purple, lensed, large, in contact on each side, in trapezoidal arrangement open to front. Antennae cirriform, slightly longer than prostomial width. Palps shorter than antennae, with cylindrical palpophores and sperical to oblong palpostyles. Longest tentacular cirri about as long as anterior 15 setigers, shortest ones about as long as anterior 5 setigers. Notopodia of setigers 1 and 2 subbiramous with dorsal cirri, single ligules and acicula; neuropodia similar to those following segments. Following parapodia biramous (Figs. 5a, b). Dorsal cirri behind first few segments almost as long as body width without parapodia. Upper notopodial ligules as long as lower ones on anterior segments, posteriorly slightly reduced in length but remaining subequal to lower ligules (Fig. 5b; Kinberg, 1866:Pl. 20, Fig. 5f); both upper and lower ligules after about setiger 20 remaining relatively constant to posterior end (Figs. 5a, b). Presetal lobes of anterior segments extending as conical projection slightly past tips of acicula on lower sides, reduced to acicular lobes by setiger 20. Postsetal lobes of anterior segments not extending to tips of acicula, slightly asymmetrical, with tips directed slightly ventrally, gradually reduced in size but continuing to middle part of body or beyond. Neuropodial ligules of anterior setigers about as long as lower notopodial ligules, reduced in length posteriorly, but extending almost as

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Fig. 5. *Ceratonereis tentaculata*, syntypes: a, Parapodium from setiger 24, posterior view; b, Posterior parapodium, anterior view; c, Notopodial falciger; d, Same, from setiger 24; e, Neuropodial falciger from middle segment; f, Upper neuropodial falciger from middle segment; g, Notopodial falciger from setiger 30; h, Same, from setiger 24; i, Upper neuropodial falciger from setiger 30; j, Same from middle setiger; k, Lower neuropodial falciger from setiger 30; l, Same, from setiger 24 (a,d,f,h,j,l, large syntype; c,e,g,i,k, small syntype; b, posterior fragment).

far as neuropodial aciculum on posterior segments. Ventral cirri of anterior and middle segments extending slightly farther laterally than lower neuropodial ligules, slightly shorter than ligules posteriorly (Fig. 5b) or possibly longer (Kinberg, 1910:Pl. 20, Fig. 5f). Notopodia with sesquigomph spinigers beginning on setiger 3, joined by sesquigomph falcigers beginning on setiger 15–20; blades of falcigers long, slender, with broadly bifid to distinctly bidentate tips (Figs. 5c, d, g, h), stiff hairs on edge short proximally, gradually longer distally, extending about to tips; 1–2 falcigers, 3–5 spinigers on setiger 23; 3 falcigers, 1–2 spinigers on posterior parapodia. Upper neurosetae consisting of posterior row of sesquigomph spinigers and anterior group of few heterogomph falcigers; blades of falcigers of anterior segments long, with evenly rounded, unidentate tips (Kinberg, 1910:Pl. 20, Fig. 5g), blades of upper neuropodial falcigers on middle and posterior segments long, slender (Fig. 5f), with tips similar to those of notopodial falcigers, with stiff hairs similar but extending well past tips on large syntype (Figs. 5f, j), slightly past tips on small syntype (Figs. 5e, i); 3 falcigers, 5 spinigers on setiger 23; 2 falcigers, 4 spinigers on posterior parapodia. Lower neurosetae heterogomph spinigers and falcigers; blades of falcigers of anterior segments similar to those of upper neuropodial falcigers; blades of middle and posterior segments similar to those of upper neuropodial falcigers, with shorter blades; tips with distinct, small secondary tooth above, changing to unidentate and concave, then to evenly rounded on outer edges of tips below (Figs. 5k, l); 6 falcigers, 10 spinigers on setiger 23; 5 falcigers, 4 spinigers on posterior parapodia. Acicula light amber. No indication of heteronereidid modification of syntypes.

Proboscis: area I, 0 paragnaths; II, long oval group of 8–9; III, triangular group of 6; IV, oval group of 11; V, reduced; VI, soft, cushion-shaped lobe; VII–VIII, without structures. Jaws brown, with about 7 teeth.

Remarks.—*Ceratonereis tentaculata* is similar to *C. mirabilis* in the prostomium, the tentacular segment, and the falcigers, but differs as indicated in the key. Further, stiff hairs on tips of neuropodial falcigers of *C. tentaculata* are slightly longer than those of *C. mirabilis* on the larger, mature syntype. These differences appear more important than generally believed. Because sexual reproductive stages of both *C. mirabilis* and *C. tentaculata* are unknown and may also differ, I am for the present retaining *C. tentaculata*.

In addition to the type-specimens from Hawaii, Imajima's (1972) account of *C. mirabilis* indicates that *C. tentaculata* is also found in Japan; his account certainly referred to at least two species. Augener (1913), who examined the type-specimens, reported this species from Western Australia. Other accounts of *C. mirabilis* and *C. tentaculata* from Indo-Pacific areas may have referred to this species or to other species. Hartman's (1954a) specimens from South Australia (AHF 37651), reported as *C. mirabilis*,

were examined and are a different species very similar to *C. singularis*; Horst's account (1924:36) referred in part (Sarassa specimen, Siboga Sta. 43) to an undescribed species. A specimen from Bikini (AHF 35912) reported by Hartman (1954b) as *C. mirabilis* and which I examined, appears to be the same as the latter.

Ceratonereis excisa (Grube)

Fig. 6

Nereis excisa Grube, 1874:72, 73.

Nereis (*Ceratonereis*) *tentaculata*.—Augener, 1913:168–171 [in part].

Material examined.—BRAZIL: Desterro [Florianópolis, Santa Catarina Is.], F. Müller, col., 2 syntypes (ZMB Q 3504).

Description.—Larger syntype of 88 segments, 22 mm long, 1.2 mm wide without parapodia, 2.1 mm wide with parapodia; smaller syntype of about 95 segments, 16 mm long, 0.7 mm wide without parapodia, 1.5 mm wide with parapodia. Colorless in alcohol. Prostomium (Fig. 6a) about as long as wide, anteriorly incised for short length, laterally rounded, slightly concave posteriorly. Two pairs of relatively small eyes on posterior half in trapezoidal arrangement open to front; prominent, subdermal glandular area between anterior eyes and antennae. Antennae cirriform, longer than prostomium and palpophores by about half. Palps with long, cylindrical palpophores and small, oblong palpostyles (relatively broader on smaller syntype). Upper tentacular cirri equal to about 10 segments in length; lower tentacular cirri to 4 segments in length. Notopodia of setigers 1 and 2 subbiramous with dorsal cirri, single ligules, and acicula; neuropodia similar to those of following segments. Following parapodia biramous (Figs. 5b–f). Dorsal cirri about as long as parapodial length behind anterior few segments, about as long as body width without parapodia by setiger 25, continuing about as long to posterior end, with bases elongating into short cirrophores on middle and posterior segments. Upper notopodial ligules of anterior few segments about as long as neuropodial presetal lobes, reduced to small papillae near lateral borders of dorsal cirrophores by setiger 25 and absent after setiger 32 of large syntype; reduced by about setiger 35 and absent by setiger 55 of small syntype (Figs. 6c–f). Lower notopodial ligules continuing relatively undiminished to posterior end. Neuropodial presetal lobes reduced to acicular lobe by about setiger 20. Neuropodial postsetal lobes foliaceous, extending about as far as acicular lobe on anterior segments, gradually reduced to obscure, rounded lobes on posterior segments. Neuropodial ligules extending farther than acicular lobes on anterior 10–12 setigers, rapidly reduced in length posteriorly and much shorter than acicular lobes, continuing as short lobes to posterior end. Ventral cirri similar in size throughout, extending laterally for much shorter distance than lower neu-

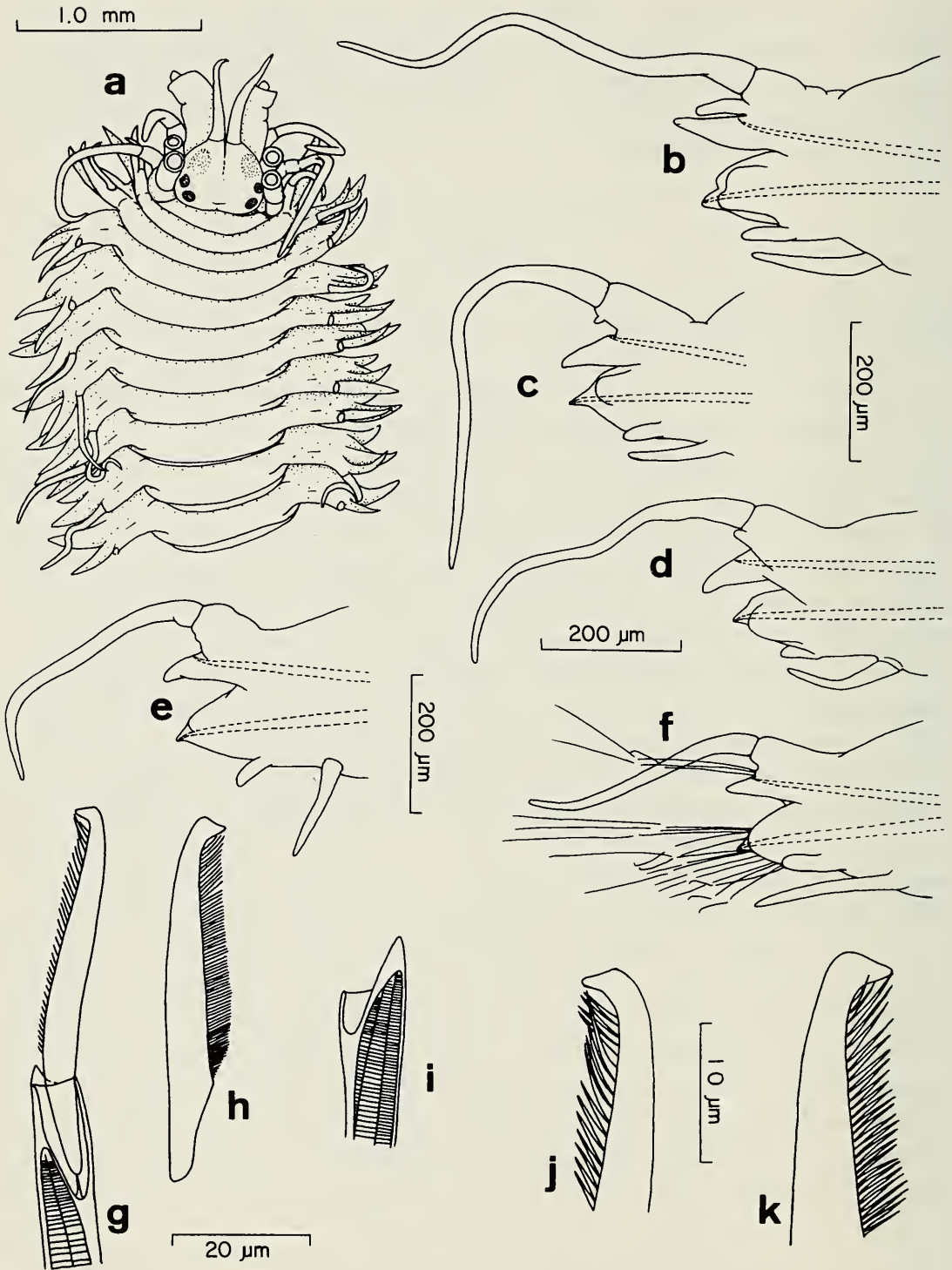


Fig. 6. *Ceratonereis excisa*, syntypes: **a**, Anterior end, dorsal view; **b**, Parapodium from setiger 25, posterior view; **c**, Parapodium from setiger 40, posterior view; **d**, Parapodium from setiger 50, posterior view; **e**, Parapodium from setiger 60, posterior view; **f**, Posterior parapodium, posterior view; **g**, Notopodial falciger from setiger 40; **h**, Blade of upper neuropodial falciger of same; **i**, Shaft of same; **j**, Tip of **g**, magnified; **k**, Tip of **h**, magnified (**a**, large syntype; **b-k**, small syntype).

ropodial ligules on anterior segments, thereafter extending about as far as ligules to posterior end. Notopodia with sesquigomph spinigers beginning on setiger 3, joined by sesquigomph falcigers beginning on setiger 18 on larger, 16 on smaller syntype (Figs. 6g, j). Upper neurosetae consisting of posterior row of sesquigomph spinigers and anterior group of heterogomph falcigers. Lower neurosetae heterogomph spinigers and falcigers. Blades of falcigers small, slender, unidentate, with outer edges of tips evenly rounded on anterior segments, flattened or slightly concave on middle and posterior segments. Stiff hairs on blade edge shorter proximally to longer distally on notopodial falcigers of middle and posterior segments; stiff hairs long, similar in length throughout on blades of neuropodial falcigers (Figs. 6h, k); hairs relatively fine, not extending to tips of blades. Setae of setiger 22 of large syntype: notosetae, 1 falciger, 6 spinigers; upper neurosetae, 2 falcigers, about 10 spinigers; lower neurosetae, 3 falcigers, about 12 spinigers. Parapodium of setiger 40 of small syntype with fewer notopodial and upper neuropodial spinigers. Setae of posterior parapodium: notosetae, 1 falciger, 2 spinigers; upper neurosetae, 2 falcigers, about 10 spinigers; lower neurosetae, 3 falcigers, about 10 spinigers. Acicula clear proximally, light brown distally. Small syntype with single anal cirrus about twice as long as posterior dorsal cirri. No sexually modified specimens.

Proboscis examined on dissected specimen as follows: area I, 0 paragnaths; II, 5; III, 6; IV, 7; V, reduced; VI, cushion-shaped lobe; VII–VIII, without structures (groups II–IV, according to Grube, 1874).

Remarks.—In addition to the distinguishing characters included in the key, *C. excisa* is unique in having prominent subdermal structures, possibly associated with the brain, between the anterior eyes and antennae, and a reduced number of lower neuropodial falcigers.

The species is known only from the original report.

Ceratonereis singularis Treadwell

Figs. 7–10

Ceratonereis mirabilis.—Ehlers, 1887:117–120, Pl. 37, Figs. 1–6 [in part].—Treadwell, 1939:222, Fig. 47 [figure only, taken from Ehlers, 1887].—Hartman, 1956:248; 1968:505–506, Figs. 1–4.—Rioja, 1960:249; 1963:166.—Fauchald, 1973:21 [part from Naos Island, Panama].—Gardiner, 1976:147, Figs. 14f–j [not Kinberg, 1866].

Ceratonereis singularis Treadwell, 1929:1–3, Figs. 1–8.

Ceratonereis tentaculata.—Hartman, 1940:218, Pl. 35, Fig. 47 [in part?].—Rioja, 1941:705, Pl. 8, Fig. 10; 1947:203 [not Kinberg, 1866].

Nereis (Ceratonereis) tentaculata.—Berkeley and Berkeley, 1960:359 [in part; not *Ceratonereis tentaculata* Kinberg, 1866].

Material examined.—MEXICO: San José Island, Gulf of California, 25–26 Mar. 1911, holotype, heteronereidid of unknown sex (AMNH 1986); Cerralvo Island, Gulf of California, 24°08'N, 109°50'W, 1935, Treadwell, det., 1 heteronereidid anterior fragment of unknown sex (AMNH 3159); La Paz harbor, Gulf of California, Klawe, col., 11 Mar. 1959, 2 heteronereidids of unknown sex (fragments of 1 complete and 1 incomplete specimen; as *Nereis* (*Ceratonereis*) *tentaculata* by the Berkeleys, USNM 58734); Bahia Fal-sa, La Paz, Gulf of California, W. Shepherd, col., 14 Nov. 1971, 1 atokous male specimen, prostomium and tentacular segment missing (USNM 48857); Zihuatanejo, Klawe, col., 9 June 1958, 2 specimens (complete atokous female, anterior and middle fragments, USNM 35688). PANAMA: Naos Island, Dexter, col., 30 June 1969, 1 anterior fragment of immature specimen (AHF; as *C. mirabilis* by Fauchald). NORTH CAROLINA: Onslow Bay, 34°20'N, 75°54'W, 24 m, on rock and dead coral, E. Powell, col., 4 Nov. 1974, 2 specimens (USNM 52930; as *C. mirabilis* by Gardiner). FLORIDA, EAST COAST: Just N of Sebastian Inlet on NE side of Indian River, Brevard County, 100 m offshore, Indian River Coastal Zone Study, Sta. 116D, 29 May 1965 (SIFP 50:0785); Hutchinson Island, Sta. IV, 27°20.7'N, 80°12.8'W, about 11 m, coarse calcareous sand, 11 specimens (1 female partially developed heteronereidid; USNM 58735, 58736; FSBC I 22616–22620); Sta. V, 27°22.9'N, 80°13.9'W, about 11 m, coarse calcareous sand, 2 specimens (FSBC I 22621, 22622). FLORIDA, GULF OF MEXICO: Florida Bay, USFC *Fish Hawk*, 29 Jan. 1903, 2 anterior fragments (USNM 28170); Saddlebunch Key, Monroe County, intertidal, sand, S. L. Gardiner, col., Mar. 1972, 1 anterior fragment of partially modified male heteronereidid (USNM 53742); Conch Key, Monroe County, intertidal, sand, H. Wilson, col., 9 Mar. 1975, 1 anterior fragment (USNM 53743); Key West, Monroe County, 2–4 m, U.S. Coast Survey steamer *Blake*, 1877–78, 1 partially modified male heteronereidid, 1 atokous female (as *C. mirabilis* by Ehlers; MCZ); off Shark River, Monroe County, 25°30'N, 81°27'W, 5.4 m, on stone crab trap, R. Sullivan et al., cols., 15 July 1976, 1 atokous male (FSBC I 22623). GULF OF MEXICO: 33 m, E. Powlus, col., 26 Aug. 1961, 1 specimen (USNM 55605). COLOMBIA: Barú Island, Cartagena, over floating wood, P. Ricardo Dueñas, col., Nov. 1978, 1 specimen (USNM 58737).

Description.—Complete eastern Pacific atokous gravid female of about 65 setigers (USNM 35688) 18 mm long, 1.7 mm wide with parapodia (Rioja, 1941, 1963, reported specimens 25–40 mm long and 1.5–2 mm wide; Treadwell, 1929, stated specimens averaged 15 mm length). Western Atlantic specimens mostly larger; complete, immature, atokous specimen of 60 setigers (USNM 58736), from Hutchinson Island, 20 mm long, 2 mm wide including parapodia; partially metamorphosed female anterior fragment (USNM 58735) slightly wider; Ehlers' specimens (1887; MCZ) including anterior fragment of partially metamorphosed male of 39 setigers, 18 mm

long, slightly less than 5 mm wide with parapodia, and nearly complete, atokous female of 56 setigers, 22 mm long, 4 mm wide including parapodia; largest specimen, partially metamorphosed male anterior fragment of 41 setigers (USNM 53742) 42 mm long, 4.7 mm wide with parapodia (apparently relaxed before fixation and preservation). Eyes dark red; reddish-brown pigment on anterior part of body; prostomium pigmented on medial borders of anterior lobes, on lateral and posterior margins, and on large suboval area between posterior pair of eyes; tentacular segment with narrow bands on anterior and posterior margins; dorsum of anterior setigerous segments with 2 transverse bands, anterior ones continuing on dorsal sides of parapodial lobes, posterior bands near posterior margins and continuing on posterior sides of parapodia.

Atokous specimens: prostomium (Fig. 7a; Ehlers:1887, Pl. 37, Fig. 1; Gardiner, 1976:Fig. 14f) about 1.5 times wider than long, incised anteriorly to about level of anterior eyes, rounded laterally and posteriorly. Antennae about as long as prostomial width, cirriform, occasionally with blunt tips; palps with long subcylindrical palpophores and short rounded palpostyles, together about as long as antennae or much shorter when contracted; palps and antennae often widely divergent. Eyes with lenses, in trapezoidal arrangement open to front, subequal on Pacific specimens, with anterior pair up to 1.5 times larger on Atlantic specimens. Longest tentacular cirri about equal to length of first 10–15 setigers. Notopodia of setigers 1 and 2 (Figs. 7b, 8c) subbiramous, with short dorsal cirri, usually shorter single ligules and slender acicula; neuropodia similar to those of following segments but with smaller postsetal lobes. Following parapodia biramous (Figs. 7b, c, 8a, b, 9). Parapodia relatively long throughout body. Dorsal cirri behind first few setigers about $\frac{3}{4}$ segmental width on some Pacific specimens, about as long as segmental width without parapodia on Atlantic specimens. Upper and lower notopodial ligules subequal on anterior segments, relatively long, $\frac{1}{3}$ – $\frac{1}{4}$ length of dorsal cirri; upper ligules gradually reduced posteriorly, shorter than lower notopodial ligules, usually about as long as part of lower ligules extending past tips of acicula, shorter on immature specimens; lower ligules relatively prominent throughout, decreasing in length posteriorly proportionate to parapodial size, usually extending farther than other parapodial lobes. Neuropodial presetal lobes behind first few segments shorter than lower notopodial ligules, usually extending farther than neuropodial ligules, reduced to acicular lobes on middle and posterior segments. Neuropodial postsetal lobes prominent on anterior segments, with rounded or slightly papillate tips, extending about to tips of acicula, gradually reduced to obscure, rounded lobes on posterior segments. Neuropodial ligules longer than presetal lobes on first few setigers, gradually reduced posteriorly proportionate to reduction in parapodial size, extending to near tips of presetal or acicular lobes on Pacific specimens, extending about $\frac{1}{2}$ as far and usually

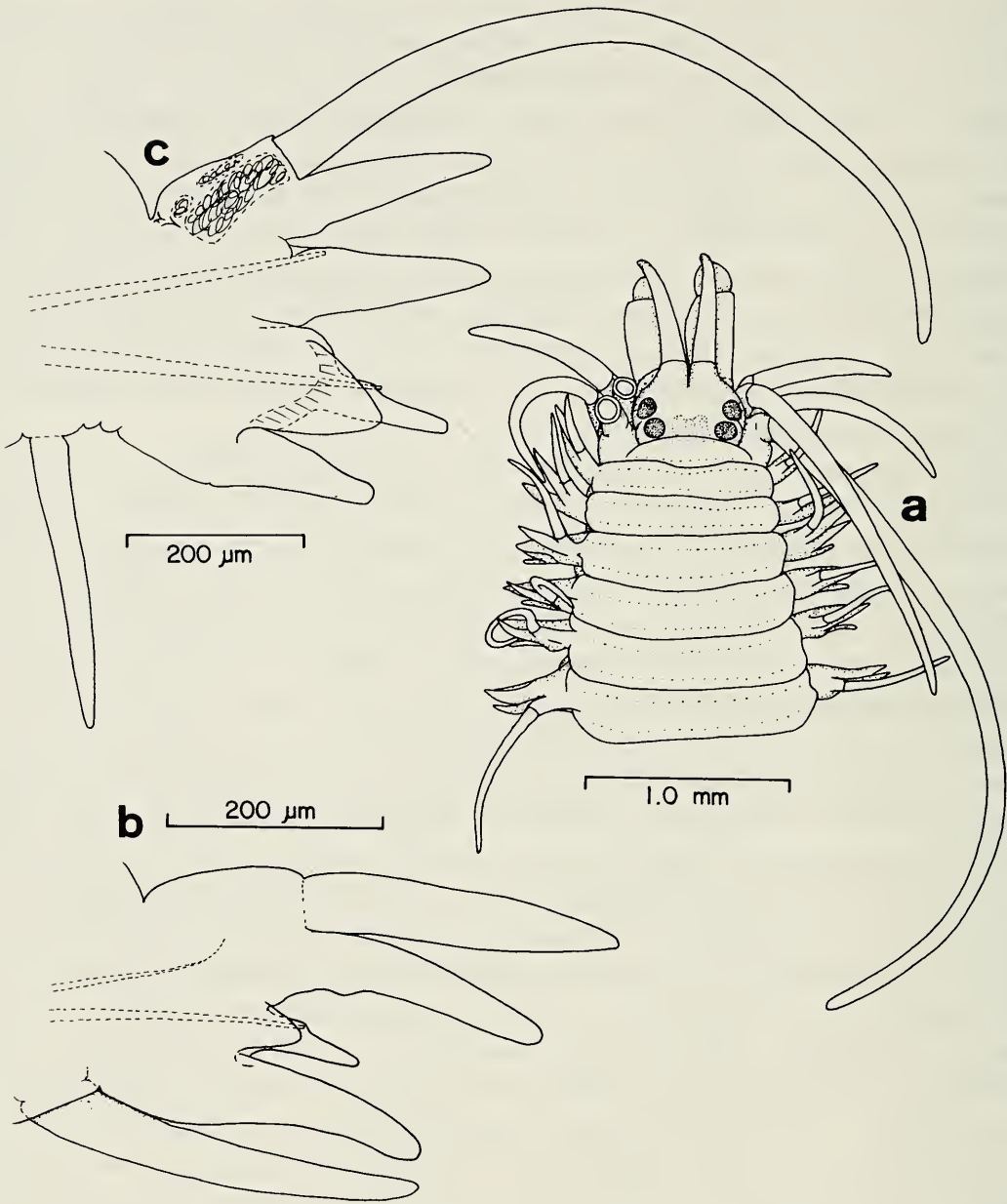


Fig. 7. *Ceratonereis singularis* (gravid, atokous female from Zihuatanejo, western Mexico, USNM 35688): a, Anterior end, dorsal view; b, Parapodium from setiger 1, posterior view; c, Same, from setiger 10, posterior view.

more slender on Atlantic specimens. Ventral cirri slender, similar in relative size throughout, not extending as far as parapodial lobes. Notopodia with sesquigomph spinigers beginning on setiger 3, joined by long-bladed, sesquigomph falcigers beginning on setigers 14–20; blades of spinigers with short, stiff hairs from bases to near tips; blades of falcigers with unidentate tips, evenly rounded to slightly concave distally (Figs. 10a–d, h–k, m); 30–50 stiff hairs on edge, short proximally, gradually increasing in length,

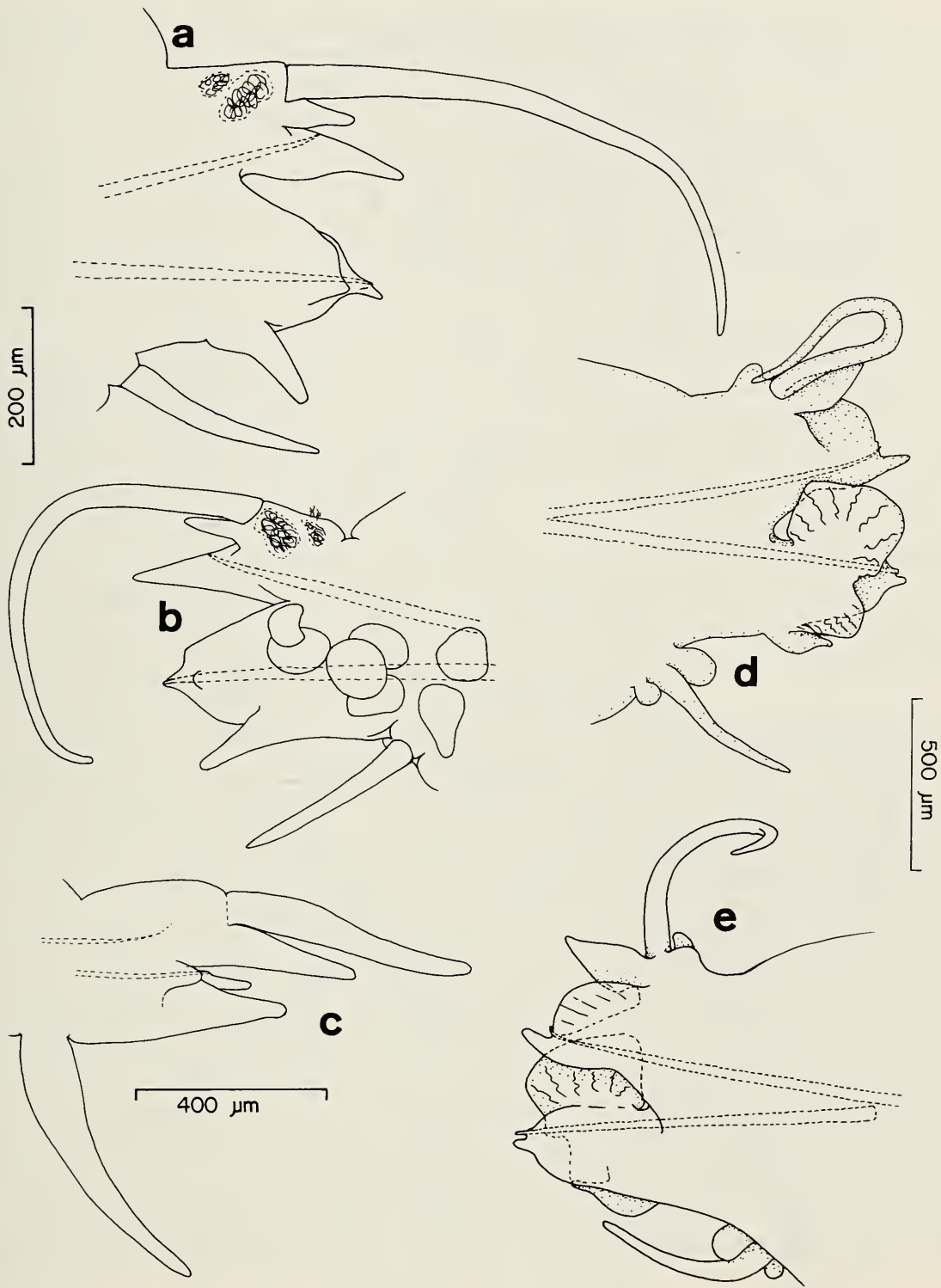


Fig. 8. *Ceratonereis singularis* (eastern Pacific specimens): a, Parapodium from setiger 30, posterior view; b, Parapodium from posterior setiger, posterior view; c, Parapodium from setiger 1 of heteronereidid, posterior view; d, Parapodium from setiger 25 of heteronereidid, posterior view; e, Parapodium of setiger 24 of same, anterior view (a,b, gravid, atokous female, USNM 35688; c, USNM 35687; d,e, holotype).

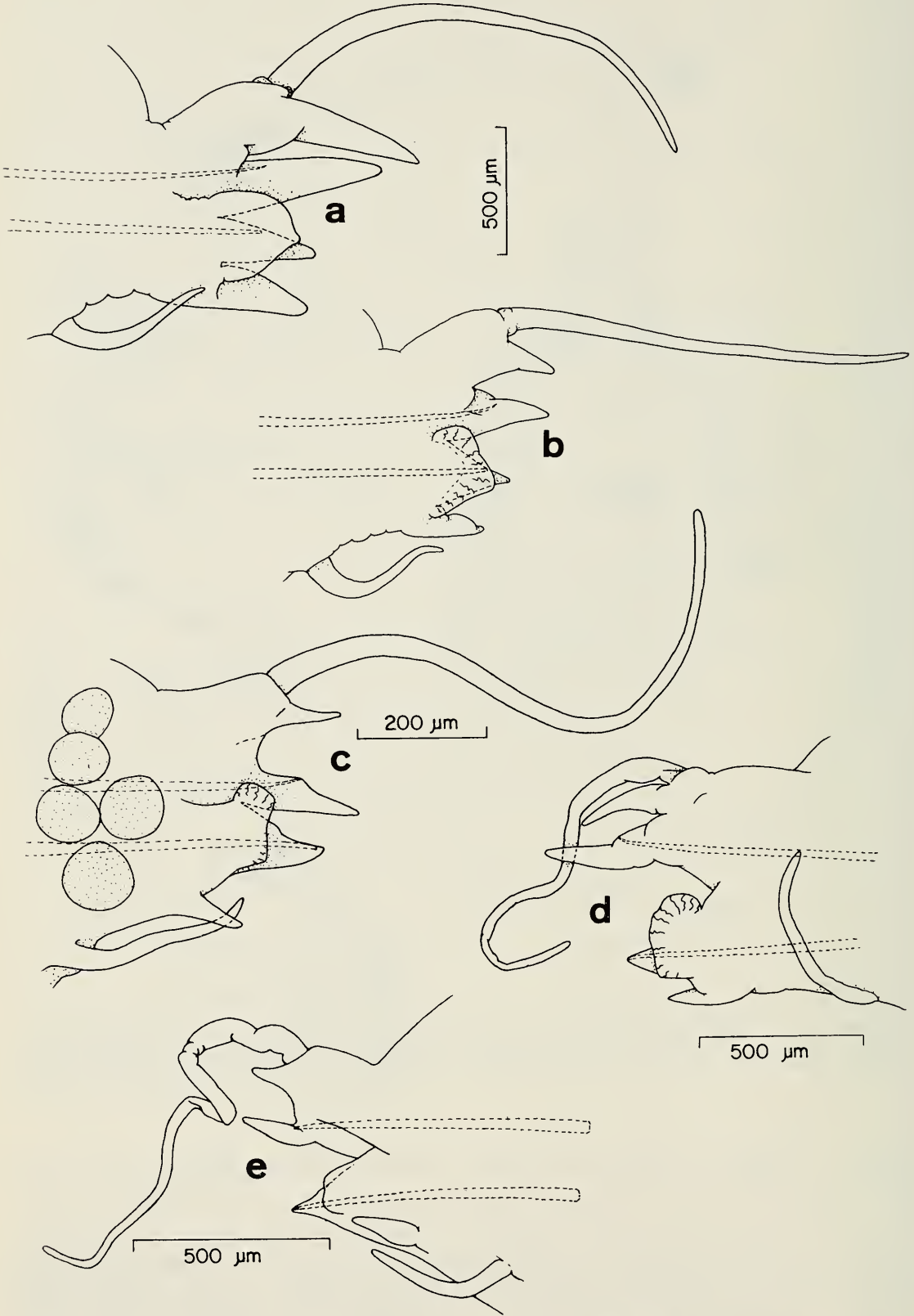


Fig. 9. *Ceratonereis singularis* (western Atlantic specimens): a, Parapodium from setiger 15, posterior view; b, Parapodium from setiger 30, posterior view; c, Parapodium from setiger

abruptly longer distally and extending beyond tips; falcigers smaller on first few segments, thereafter stouter, subequal throughout; 1–2 falcigers on Pacific specimens, 2–5 on Atlantic, 2–4 spinigers on parapodia of about setiger 30; 1–2 falcigers, 2 spinigers on posterior parapodia. Upper neurosetae consisting of posterior row of sesquigomph spinigers and anterior group of long-bladed, heterogomph falcigers; blades of falcigers of anterior segments figured by Treadwell (1929, Fig. 7) and Ehlers (1887, Pl. 37, Fig. 3); blades on middle and posterior setigers shorter than those of notopodial falcigers with similar tips (Figs. 10e, l), with stiff hairs similar but longer proximally; 2–3 falcigers, 8–9 spinigers on about setiger 30; 1–2 falcigers, 4–5 spinigers on posterior parapodia. Lower neurosetae consisting of upper heterogomph spinigers merging with lower heterogomph falcigers; blades of falcigers of anterior segments similar to those of upper neuropodial falcigers; blades of falcigers of middle and posterior segments as long as upper neuropodial falcigers above but lower ones shorter, with similar stiff hairs, with more slender, straighter tips (Figs. 10f,g); 6–9 falcigers, 6–10 spinigers on parapodia of about setiger 30; 5–8 falcigers, 3–5 spinigers on posterior parapodia. Acicula dark brown on distal half in anterior and middle segments of mature specimens. About 3 rows of ciliary tufts on dorsum of setigerous segments, with middle row extending on upper edges of parapodia of some specimens, several rows evident on one specimen (USNM 53742).

Epitokous specimens: prostomium of Pacific specimen with slightly enlarged anterior eyes, with long, enlarged, lanceolate antennae. Unmodified anterior region 16 setigers, with dorsal cirri possibly slightly stouter on anterior few setigers (Fig. 8c); region of swimming parapodia (Figs. 8d, e) of 12–15 segments and “tail” of 25–35 segments; swimming parapodia with atokous setae replaced entirely by swimming setae, with accessory lobes above dorsal cirri and above and below ventral cirri; dorsal cirri shorter than on more anterior and posterior segments, with lamellae between notopodial ligules and bilobed neuropodial postsetal lamellae; tail region of shortened segments, with parapodia similar to those of atokous specimens but without setae. Pygidium of all specimens examined (about 4) without cirri. Atlantic specimens including 3 partially modified heteronereidids: small female from Hutchinson Island, Florida (USNM 58735), with neuropodial lamellae beginning on setiger 19, continuing to setiger 32, with swimming setae partially replacing normal setae; larger males from Key West (MCZ) and Saddlebunch Key, near Key West, Florida (USNM 53742) with

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25, posterior view; **d**, Parapodium from setiger 25, posterior view; **e**, Parapodium from setiger 51, posterior view (**a,b**, metamorphosing male?, USNM 53742; **c**, metamorphosing female, USNM 58735; **d,e**, metamorphosing male, MCZ).

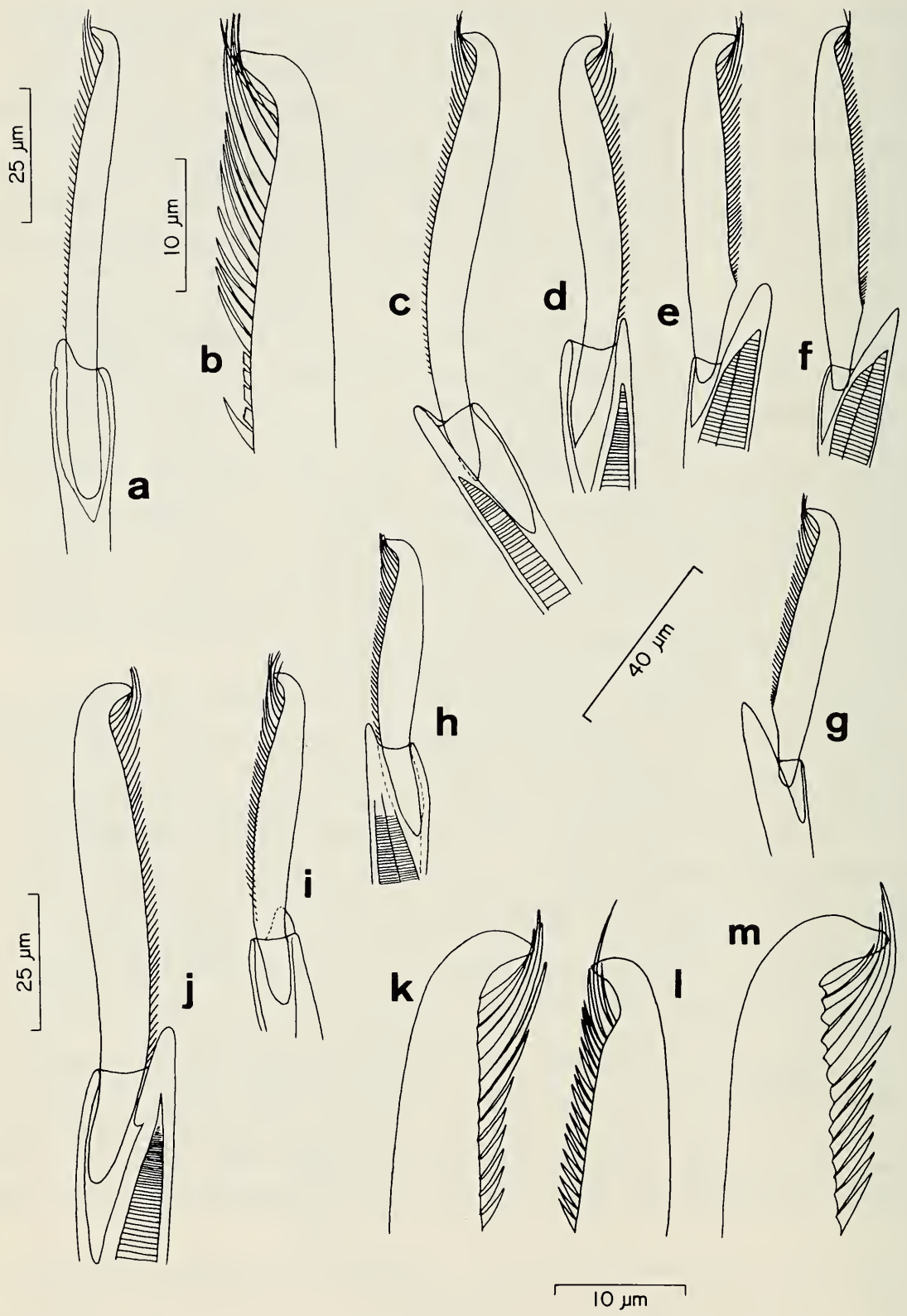


Fig. 10. *Ceratonereis singularis* (falcigers): a, Notopodial, from setiger 14; b, Tip of a, magnified; c,d, Notopodial, from posterior parapodium; e, Upper neuropodial, from posterior parapodium; f,g, Lower neuropodial, from posterior parapodium; h-j, Notopodial; k, Tip of

neuropodial lamellae beginning on setigers 20 and 22, respectively, without swimming setae on partially modified parapodia; specimens otherwise similar to atokous specimens (Figs. 9b–d).

Proboscis examined by dissection as follows: area I, 0 paragnaths; II, 9–15 in crescent-shaped double row or elongate-oval group; III, 6–10 small cones in small subtriangular to oval group; IV, 10–16, similar in size to those of II, in almost circular group; V, reduced; VI, soft, cushion-shaped lobe; VII–VIII, without structures. Jaws amber to brown with darker margins, with 5–6 teeth.

Remarks.—No diagnostic setae (notopodial falcigers and neuropodial falcigers of middle and posterior segments) remain on the holotype, a heteronereidid, and Treadwell (1929) did not figure one. There are no paratypes deposited in the American Museum of Natural History. A few notopodial falcigers (Figs. 10a, b) were found on setigers 14–16 of a hereonereidid identified by Treadwell as *C. singularis* from near the type-locality (AMNH 3159). The specimen is an anterior fragment of about 25 segments agreeing well with Treadwell's description and the holotype. Similar falcigers were found on another heteronereidid from La Paz, Baja California, Mexico (USNM 58734). Both specimens of the latter lot are missing antennae, but they were apparently enlarged. They otherwise agree well with the holotype. Similar falcigers and parapodia were found on two atokous specimens, including one gravid female, from western Mexico (Figs. 10c, d; USNM 35688) and an atokous male from La Paz identified by the collector as *C. mirabilis* but missing the prostomium and tentacular segment (Fig. 10m; USNM 48857).

Western Atlantic specimens differ slightly from eastern Pacific specimens in average size, in having larger anterior eyes on atokous specimens, slightly longer dorsal cirri, shorter neuropodial ligules on posterior segments and possibly in a more posterior beginning of swimming parapodia on heteronereidids. The setae, however, appear almost identical [specimens from the Gulf of California have falcigers with tips slightly more concave than those of other Atlantic and Pacific specimens (Figs. 10a, b, m vs. 10c, e, h)], and the number and arrangement of paragnaths on the proboscis also appear to be the same. Treadwell's description was apparently incorrect in indicating a larger number of paragnaths on area III than on area IV.

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notopodial, magnified; **l**, Tip of upper neuropodial, magnified; **m**, Tip of notopodial, from setiger 31, magnified (**a,b**, heteronereidid from Cerralvo Is., Gulf of California, AMNH 3159; **c–g**, gravid, atokous female from Zihuatanejo, western Mexico, USNM 35688; **h,i**, gravid metamorphosing male from Key West, Gulf of Mexico, MCZ; **j**, gravid metamorphosing female from Hutchinson Island, USNM 58735; **k,l**, from Hutchinson Island, FSBC I 22619; **m**, gravid, atokous male from La Paz, Baja California, USNM 48857; **h,i**, not scaled).

Hartman (1940:218, Pl. 35, Fig. 37) and Rioja (1941:705, Pl. 8, Fig. 10; 1947:203) under *C. tantaculata*, and Hartman (1956:248) and Rioja (1960:249; 1963:166) under *C. mirabilis* included *C. singularis* in synonymy, and both figured falcigers similar to those of *C. singularis*. However, their records, especially those of Hartman (1940), cover a broad geographic and depth range from southern California to Ecuador, including the Gulf of California and the Galapagos Islands, and may include other species. Specimens reported by Berkeley and Berkeley (1960) from La Paz as *Nereis* (*Ceratonereis*) *tentaculata*, which I examined, include *C. singularis* (USNM 58734) and heteronereidids of another *Ceratonereis* species (USNM 35687). The latter species has an incised prostomium, a dark brown bar completely covering the dorsum of the tentacular segment, very long dorsal cirrophores on posterior segments, no upper notopodial ligules on posterior segments, and a single specimen with one bidentate falciger. Another heteronereidid from Sta. Elena Bay, Ecuador (USNM 35686), identified as the same species by the Berkeleys, has 4–7 very large paragnaths on areas II and IV of the proboscis and 2 very small ones on area III. The specimen reported by Fauchald (1973) as *C. mirabilis* from Naos Island, Panama, is *C. singularis*; his specimen from Santa Marta, Colombia, is a juvenile, possibly of the same species.

Ceratonereis singularis includes two specimens from Key West referred to *C. mirabilis* by Ehlers (1887). The tag accompanying the specimens indicates that Ehlers had first intended to report the specimens as *Nereis excisa*, which is a different species. Further, it is apparent that the Key West specimens were used almost completely, if not completely, in the formulation of his description of *C. mirabilis*, and that another specimen from Blake Sta. 11 (MCZ 763) 24°34'N, 83°25'W, 68 m, was used only superficially. No parapodia were removed from the latter and the proboscis was not dissected. This specimen proved to be *C. mirabilis*. Material reported by Ehlers from 13 m off Key West is apparently not held by the Museum of Comparative Zoology.

Ceratonereis singularis, as presently defined, ranges from Mexico to Panama in the eastern Pacific Ocean and is reported from North Carolina, eastern and southern Florida, the Gulf of Mexico, and Colombia in the western Atlantic.

Ceratonereis longicirrata, new species

Figs. 11, 12

Nereis gracilis.—Treadwell, 1924:13 [in part, specimens from Pelican Island; not Webster, 1884].

Ceratonereis mirabilis.—Allen, 1957:52.—Vittor, 1975:79.—Vittor and Johnson 1977:167 [not Kinberg, 1866].

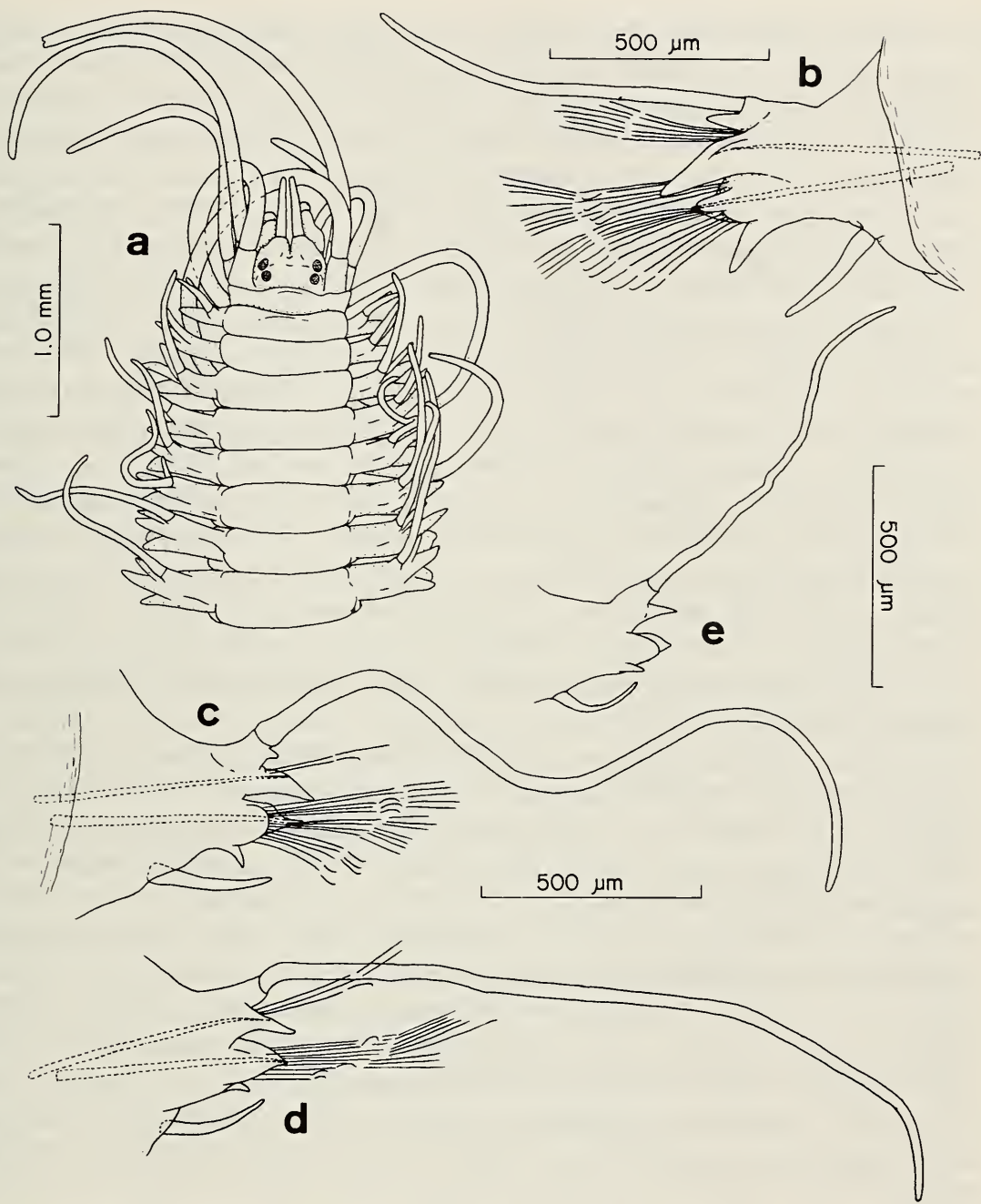


Fig. 11. *Ceratonereis longicirrata*, holotype: a, Anterior end, dorsal view; b, Parapodium from setiger 10, anterior view; c, Parapodium from setiger 25, posterior view; d, Parapodium from setiger 34, anterior view; e, posterior parapodium, posterior view.

Ceratonereis versipedata.—Vittor, 1975:79.—Vittor and Johnson, 1977:167 [in part; not Ehlers, 1887].

Material examined.—FLORIDA, EAST COAST: Hutchinson Island, 27°19.1'N, 80°13.2'W, 8.2 m, very coarse calcareous sand, Whiting et al., cols., 12 Dec. 1976, holotype (USNM 58740), 5 paratypes (USNM 58741);

Sta. II, 27°21.6'N, 80°13.2'W, about 11 m, coarse calcareous sand, 5 paratypes (FSBC I 22624–22627); Sta. III, 27°22.0'N, 80°12.4'W, about 7 m, medium calcareous sand, 1 paratype (FSBC I 22628); Sta. IV, 27°20.7'N, 80°12.8'W, about 11 m, coarse calcareous sand, 13 paratypes (FSBC I 22629–22631); Sta. V, 27°22.9'N, 80°13.9'W, about 11 m, coarse calcareous sand, 28 paratypes (USNM 54453–54455; FSBC I 22632–22638). FLORIDA KEYS: Grassy Key, 0–3.6 m, among rock and algae, *Thalassia*, E. Joyce et al., cols., Apr. 1966, 1 paratype (FSBC I 22639); Key West, *Albatross*, 15–27 Apr. 1884, 1 paratype (USNM 16745). NORTHEASTERN GULF OF MEXICO (BLM, U.S. Dept. Interior, Miss., Ala., Fla. Study, 1975–76): 29°55.0'N, 86°05.5'W, 37 m, R/V *Columbus Iselin*, 25 Sep. 1975, 1 paratype (USNM 58744); 29°55.0'N, 88°05.0'W, 37 m, R/V *Gyre*, Jan. 1976, 1 paratype (DISL); 29°56.0'N, 86°06.5'W, 38 m, R/V *Gyre*, Jan. 1976, 2 paratypes (DISL); 29°51.0'N, 86°06.5'W, 41 m, R/V *Gyre*, Jan. 1976, 1 paratype (FSBC I 22640); 29°48.0'N, 86°09.5'W, 45 m, R/V *Gyre*, Feb. 1976, 1 paratype (DISL); 29°46.0'N, 86°12.5'W, 52 m, R/V *Gyre*, Jan. 1976, 1 paratype (DISL); 29°40.0'N, 86°17.0'W, 73 m, R/V *Gyre*, Jan. 1976, 1 paratype (USNM 58745); 28°30'00.4"N, 83°29'58.4"W, 22 m, R/V *Columbus Iselin*, Aug. 1977, 2 small paratypes (USNM 55841). BAHAMAS: Hydro-Lab, Freeport, 26°30'N, 78°38'W, 16 m, in coral, B. A. Vittor and T. S. Hopkins, cols., 28 Jan. 1974, 2 paratypes (USNM 58743; DISL); S portion of Bimini Lagoon, 25°43'N, 79°16'W, in plastic sponges submerged behind reef, A. Schoener, col., 1970–71, 1 paratype (USNM 58742), 1 specimen (USNM 58746); Cherokee Sound, Great Abaco, 26°N, 77°W, in plastic sponges submerged behind reef, A. Schoener, col., 1972, 6 specimens (USNM 58747). PUERTO RICO: Parguera, M. J. Allen, col., 22 Apr. 1955, 1 heteronereidid (male *fide* Allen; USNM 28165); Mona Island Reef, Parguera, M. J. Allen, col., 14 Nov. 1955, 1 heteronereidid (female *fide* Allen; USNM 28166); Parguera, M. J. Allen, col., 21 Sep. 1955, 1 heteronereidid (female *fide* Allen; USNM 28167); Parguera, reef in front of Lab, M. J. Allen, col., 23 Mar. 1955, 2 ?male heteronereidids (USNM 33270).—BARBADOS: Pelican Island, Barbados-Antigua Exped., Univ. Iowa, 1918, 3 paratypes (USNM 20299).

Description.—Complete holotype of 59 segments, gravid atokous male, 28 mm long, 1.7 mm wide including parapodia; complete paratype of about 80 segments (USNM 20299) about 20 mm long, 1.5 mm wide including parapodia; few posteriorly incomplete atokous specimens slightly wider. Heteronereidids of 65–80 segments up to 8 mm long, 2 mm wide including swimming parapodia, usually somewhat narrower in anterior and posterior regions. Light brown pigment on dorsum of adults; prostomium with pigment on lateral and posterior margins and extending anteriorly between eyes; tentacular segment with pigment near anterior border and on lateral margins; dorsum of anterior segments with 3 evenly spaced, transverse pig-

mented bands, becoming obscure at midline; eyes dark purple, lighter on deepwater specimens from northeastern Gulf of Mexico.

Atokous specimens: prostomium (Fig. 11a) anteriorly incised to near level of anterior eyes, dorsally, laterally, and posteriorly rounded, usually partially covered by fold of tentacular segment; eyes subequal, in trapezoidal arrangement open to front, with lenses; anterior pair often appearing reniform in outline due to orientation of lens. Antennae relatively long, cirri-form; palps about as long as antennae, often bent ventrally and appearing shorter, with subcylindrical palpophores and hemispherical palpostyles. Tentacular segment slightly shorter than and about as wide as following segment; upper posterior tentacular cirri about as long as anterior 15 segments; lower, anterior cirri about as long as first 4 segments. Notopodia of setigers 1 and 2 subbiramous with dorsal cirri, single ligules and slender acicula; neuropodia similar to those of following segments but with postsetal lobes reduced on setiger 1. Following parapodia biramous. Dorsal cirri relatively short on few anterior segments, rapidly increasing in length to about as long as body width including parapodia on about setiger 15, continuing very long to posterior end. Upper notopodial ligules almost as long as dorsal cirri on first few setigers (Fig. 11a), rapidly shortened posteriorly (Figs. 11b, c), absent after about setiger 30 (Figs. 11d, e). Lower notopodial ligules about as long as upper ones on first few segments, gradually decreasing posteriorly proportionate to reduction in parapodial size. Neuropodial pre-setal lobes reduced to acicular lobes with acicula extending into tips, rounded on anterior few setigers, pointed after about setiger 10. Neuropodial postsetal lobes subtriangular, as long as acicular lobes on anterior segments, becoming much shorter and rounded on middle and posterior segments. Neuropodial ligules extending about to tips of neuropodial acicular lobes on anterior segments, becoming very short on posterior segments, extending about $\frac{1}{3}$ of distance to tips of neuropodial acicular lobes. Ventral cirri relatively long, slender throughout, shorter than neuropodial acicular lobes. Notopodia with sesquigomph spinigers beginning on setiger 3, joined by long-bladed sesquigomph falcigers (Figs. 12a, d) beginning on setiger 17 of holotype, setiger 11 of juvenile; blades of falcigers bidentate, stiff hairs on edge short proximally, gradually longer distally, extending about to tips; blades of spinigers with short, stiff hairs for most of their length; holotype with 9 spinigers on setiger 10; 1 falciger, 1–3 spinigers on parapodia after about setiger 20. Upper neurosetae consisting of posterior row of sesquigomph spinigers and anterior group of long-bladed heterogomph falcigers; blades of falcigers of anterior setigers with evenly rounded, unidentate tips; single bidentate blade beginning on setiger 10 of holotype; all blades bidentate beginning on setiger 16; bidentate blades similar to those of notopodia but with longer stiff hairs proximally (Figs. 12b, e); holotype with 12 falcigers, 6 spinigers on setiger 10; 3–4 falcigers, 8–10 spinigers on setiger 25;

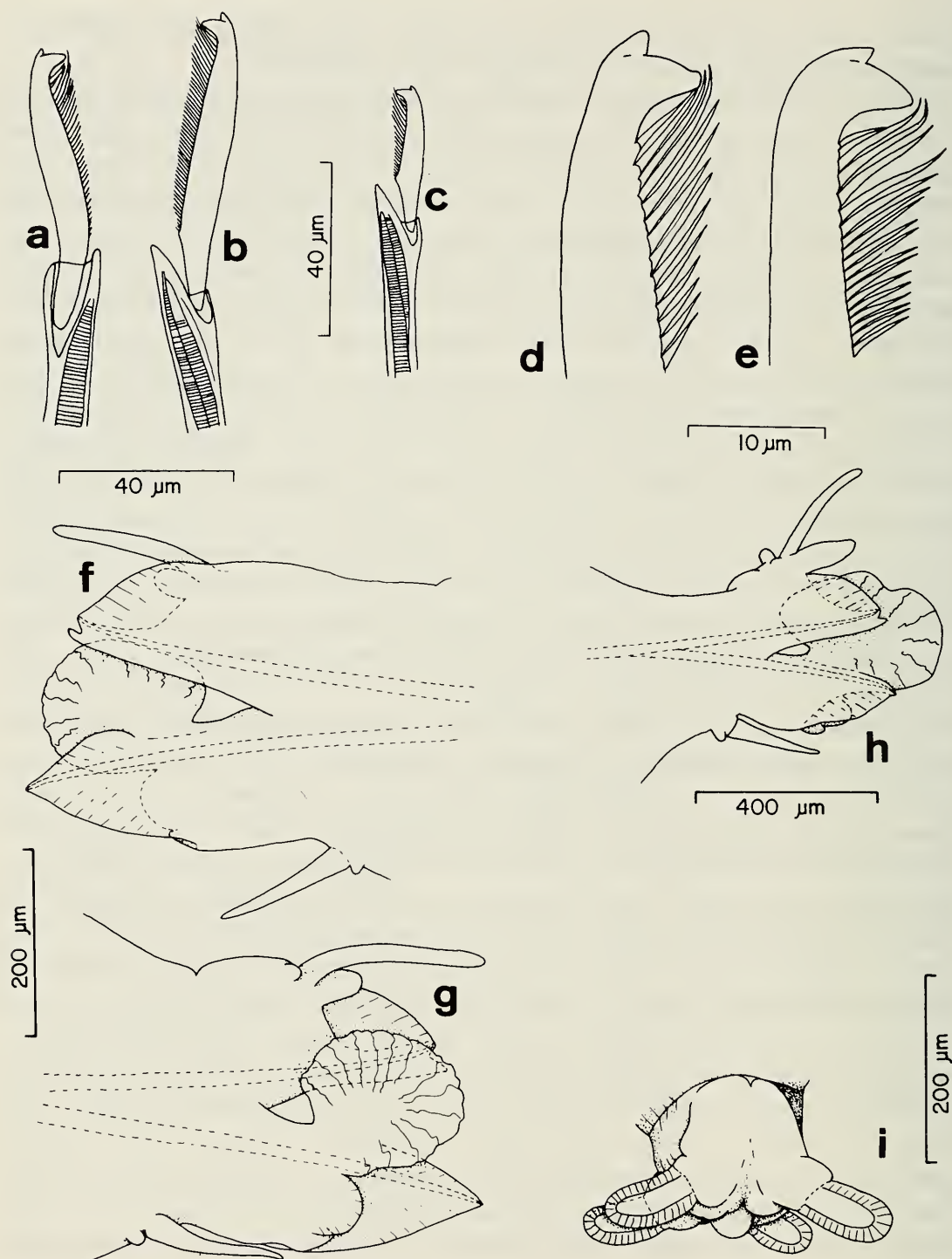


Fig. 12. *Ceratonereis longicirrata*: **a**, Notopodial falciger from setiger 25; **b**, Largest lower neuropodial falciger from same; **c**, Smallest lower neuropodial falciger from same; **d**, Tip of notopodial falciger from middle segment; **e**, Tip of neuropodial falciger from posterior parapodium; **f**, Parapodium from setiger 26,27, of female heteronereidid, anterior view; **g**, Same, posterior view; **h**, Parapodium from setiger 27 of male heteronereidid, anterior view; **i**, Pygidium of male heteronereidid, ventral view (**a**–**c**, holotype; **d**, **e**, paratype, USNM 54454; **f**, **g**, USNM 28166; **h**, **i**, USNM 28165).

2 falcigers, 4–8 spinigers beginning on setiger 35. Lower neurosetae heterogomph spinigers above and heterogomph falcigers below; blades of falcigers similar to those of upper neuropodial falcigers, becoming bidentate by about setiger 20, as long as upper falcigers above, shorter below (Fig. 12c); holotype with 12 falcigers, 6 spinigers on setiger 10; 5 falcigers, 9 spinigers on setiger 25; 3 falcigers, 7–8 spinigers on setiger 34; 6 falcigers, 3 spinigers on parapodium of fifth setiger from posterior end. Acicula in anterior parapodia of adults light brown on distal half; neuroacicula retaining most of color in posterior parapodia; uncolored proximally. Transverse rows of ciliary tufts on dorsum of setigerous segments, often prominent, appearing as raised ridges. Pygidium with anal cirri much stouter than dorsal cirri and about as long as last 10 segments.

Epitokous specimens: body divided into 3 regions, appearing constricted between regions; anterior atokous region of 15 setigers; region of about 25 segments with swimming parapodia; fusiform “tail” region of greatly shortened segments, with 25 and 30 setigers on 2 females, 40 setigers on 2 males. Eyes greatly enlarged, dark purple; palps and antennae usually bent ventrally. Parapodia of first 4 setigers of atokous region with slightly elongated, stouter dorsal cirri, slightly stouter on males than on females and somewhat sickle-shaped. Swimming parapodia (Figs. 12f–g) with natatory setae. Notopodia with single papilla above dorsal cirri, short dorsal cirrus, round-tipped upper notopodial ligule, presetal lamella above notoaciculum, lower notopodial ligule reduced to small triangular lobe below notoaciculum. Neuropodia with presetal lamella below neuroaciculum; upper part of neuropodial postsetal lamella greatly expanded laterally and dorsally behind notosetae; lower part of neuropodial postsetal lamella slightly expanded and partially fused with slightly expanded ligule; ventral cirrus similar to those of atokous parapodia; single small papilla below ventral cirrus. Males with longer, stouter upper notopodial ligules; one male with upper neuropodial postsetal lamellae much more expanded laterally and dorsally than on females. Tail region with parapodia similar to those of atokous specimens but without setae. Pygidium of females without cirri or lobes; with 4 divergent, club-shaped lobes on males (Fig. 12i).

Proboscis examined by dissection of mature specimens: area I, 0 paragnaths; II, 8–10 in 2 rows; III, small, rounded group of up to 8; IV, oval group of 8–18; V, reduced; VI, probably soft, cushion-shaped lobe; VII–VIII, no structures. Jaws small, amber-colored, with about 8 teeth.

Remarks.—I somewhat doubtfully observed soft lobes on area VI of the proboscis on one of two specimens with everted proboscis (USNM 33270, 58746). I was also unable to find diagnostic setae (notopodial falcigers and neuropodial falcigers on middle and posterior segments) on heteronereidid specimens. However, they appear to be the same species as the atokous type-specimens. Similarities are found in the shape of anterior and posterior

parapodia, in the jaws and number and arrangement of paragnaths on the proboscis and in their small size.

The posterior parapodium and falcigers figured by Fauchald (1977b:23, 24, Figs. 4a–c) of a specimen from Panama reported as *C. mirabilis* appear identical with those of *C. longicirrata*. Origin of his figured specimen was not reported. Fauchald also examined single specimens reported by Monro (1933) as *C. tentaculata* from Colon on the Atlantic side, and from Gorgona Island on the Pacific side.

C. longicirrata appears to be allied with *C. excisa* in its long, slender form, in the similar development of parapodial lobes and, except for bidentate tips, in the shape of falcigers.

Etymology.—The specific name, derived from the Latin, refers to the long, dorsal cirri of the species.

Ceratonereis sp.

Fig. 13

Material examined.—VENEZUELA: Cumaná Key, Mochima [near Cumaná], 12 m, calcareous sand, R. Edwards, col., 21 Oct. 1971, atokous male anterior fragment (USNM 47771); Mochima, beach called Las Gabarras, 8 m, among *Thalassia*, poorly sorted “silted” sand, R. Edwards, col., 11 May 1971, immature anterior fragment (USNM 49709).

Description.—Atokous male anterior fragment of 36 setigers, 14 mm long, 2.8 mm wide including parapodia; smaller specimen of about 25 setigers, 7 mm long, 2 mm wide with parapodia, 1 mm wide without parapodia. Coloration of small specimen similar to that of *C. singularis* Treadwell; 2 segmental bars on anterior 3 segments, 4 on posterior segments; larger specimen uncolored. Prostomium also similar to that of *C. singularis*, on larger specimen almost identical with that of specimen figured by Ehlers (1887:P1. 37, Fig. 1), except that antennae slightly longer and palps slightly shorter. Tentacular cirri long. Parapodia of setigers 1 and 2 subbiramous; remainder biramous (Figs. 13a–c) with dorsal cirri, upper and lower notopodial ligules, conical presetal and lamellate postsetal neuropodial lobes, neuropodial ligules and ventral cirri; setae of similar types and arrangement to other species reported herein; dorsal cirri about half as long as body width on anterior setigers and about as long as segmental width without parapodia on posterior segments of fragments; neuropodial presetal lobes reduced to acicular lobes by about setiger 20. Notopodial falcigers (Fig. 13d) stout, with rounded to pointed unidentate tips distinctly concave distally; stiff hairs uniformly stout, proximally short, slightly increasing in length, then abruptly lengthening distally and extending beyond tips. Blades of upper neuropodial falcigers of middle segments (Figs. 13e, f) very stout; tips similar to those of notopodial falcigers; stiff hairs short, fine proximally, becoming gradually

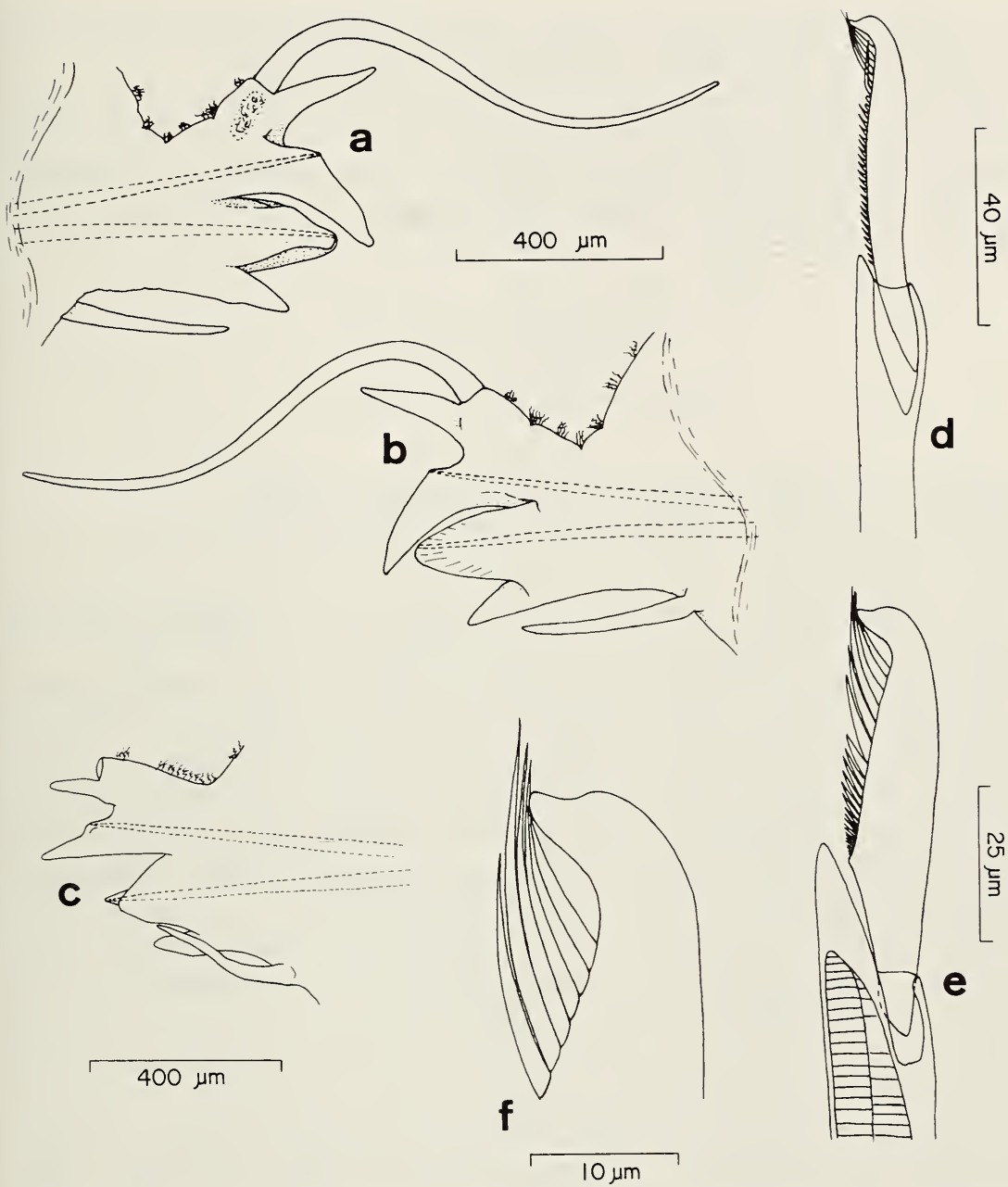


Fig. 13. *Ceratonereis* sp. (USNM 47771): a, Parapodium from setiger 23, anterior view; b, Same, posterior view; c, Parapodium from about setiger 30, posterior view, style of dorsal cirrus missing; d, Notopodial falciger from same; e, Upper neuropodial falciger from same; f, Tip of e, magnified.

longer and stouter, very stout distally and curving beyond tips. Blades of lower neuropodial falcigers similar to upper ones, but with more slender stiff hairs. Distal parts of acicula dark brown.

Proboscis of larger specimen examined by dissection: area I, 0 paragnaths; II, 11–12; III, about 9 in small group; IV, 13–14; V, reduced; VI,

soft, cushion-shaped lobe; VII–VIII, without structures. Jaws mostly amber-colored with outer edges of tips brown, with 6–7 teeth.

Remarks.—The two specimens appear to be representatives of an undescribed new species similar to *C. singularis* Treadwell, but the fragmentary condition of the material is inadequate for a complete description. The short description is provided to facilitate the recognition of more adequate material.

Nephtyidae Grube
Nephtys Cuvier
Nephtys magellanica Augener
Fig. 14

Nephtys cirrosa var.—Ehlers, 1901:67 [not Ehlers, 1868].

Nephtys longisetosa.—Ehlers, 1901:67 [not Örsted, 1843].

Nephtys magellanica Augener, 1912:208–210, Pl. 6, Figs. 27, 28.

Material examined.—STRAITS OF MAGELLAN: 3 syntypes (3 anterior fragments and 2 fragments from near posterior end; ZMH V-1199).

Description.—Uncolored; largest anterior fragment of 66 segments about 35 mm long, 4 mm wide. Prostomium with proboscis everted (Fig. 14a) with anterior margin convex, thin, spatulate; lateral margins irregularly rounded, extending to nuchal organs; posterior margin with broad, middle projection extending to posterior third of segment 1 and concave posterolateral margins joining lateral margins behind nuchal organs; greatest width immediately behind lateral antennae. Frontal antennae conical, stout, about half as broad as length of lateral margins, attached obliquely with lateral margins longer than medial ones, continuing as raised lobe some distance from junction of medial margins and anterior prostomial margin. Lateral antennae originating ventrolaterally near neuropodia of segment 1, distinctly constricted at bases, subconical, slightly longer than frontal antennae. Notopodia of segment 1 with slightly pointed acicular lobes, broad presetal lobes and short, rounded, postsetal lobes; dorsal cirri attached to lateral margins of presetal lobes, short, digitate, about $\frac{1}{3}$ as long as ventral cirri, extending posterolaterally to notopodia. Neuropodia of segment 1 on anterior margin, without lobes; ventral cirri lateral to neuropodia near anterior margin of segment, subequal to lateral antennae. Eyes not visible dorsally but visible on small syntype on interior part of dorsum of segment 1 when prostomium laid back. Lobes on segment 1 covering mouth small, hardly visible from dorsum when proboscis everted. Notosetae of segment 1 including preacicular ladder capillaries and smooth postacicular capillaries; neurosetae smooth capillaries. Parapodia of segment 2 similar to those of following segments but without branchiae and smaller; both rami with preacicular ladder capillaries

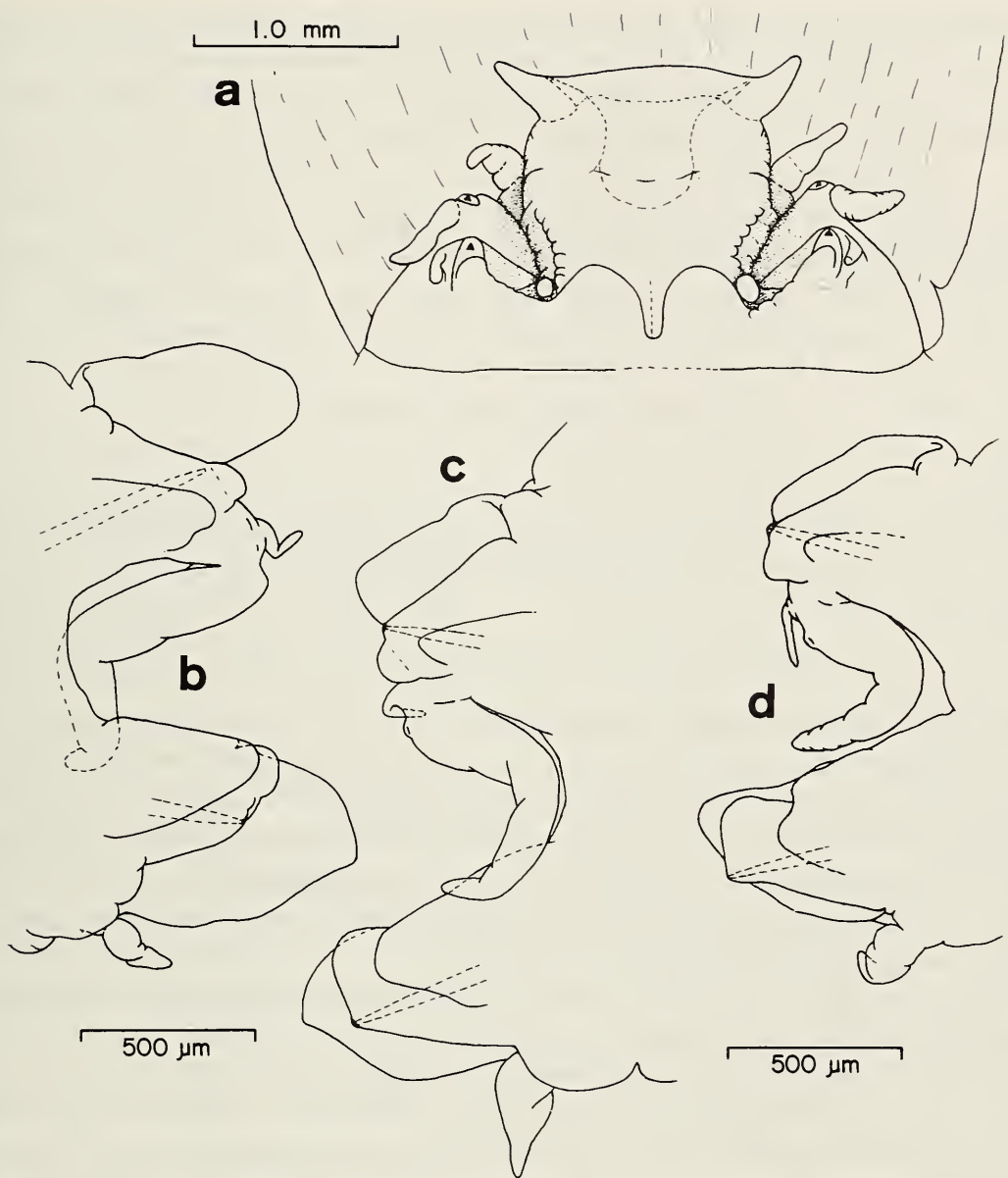


Fig. 14. *Nephtys magellanica*, syntypes: **a**, Anterior end with proboscis everted of second largest syntype, dorsal view; **b**, Parapodium from setiger 10 of largest syntype, anterior view; **c**, Parapodium from setiger 30 of same, anterior view; **d**, Parapodium from fragment of near posterior end, anterior view.

and postacicular smooth capillaries. Beginning on segment 3, parapodia similar throughout (Figs. 14b–d), fully developed by about segment 10; both notopodial and neuropodial acicular lobes indistinctly bilobed, with short lamella below notoaciculum and much broader lamella above neuroaciculum, with lobes angled and almost straight above notoaciculum and below neuroaciculum; presetal lamellae shorter than acicular lobes, rounded, with

neuropodial presetal lamellae extending from upper margins of neuropodia and showing indistinct bilobation. Notopodial postsetal lamellae beginning immediately above acicular lobes, curving posteriorly around upper setae, extending for $\frac{1}{3}$ of total length past acicular lobe on setiger 10, with rounded tips, with indistinct incision on upper margins, gradually reduced in length and shorter than acicular lobes on posterior segments; neuropodial postsetal lamellae extending about $1\frac{1}{2}$ length of acicular lobes, with slightly pointed tips, only slightly longer than acicular lobes on posterior segments and rounded; notopodial cirri short, digitate, extending from rounded lobes on upper margins of branchiae, similar in length throughout; branchiae occupying about $\frac{2}{3}$ of total length of parapodial margin between rami of middle segments, very gradually reduced in length posteriorly corresponding to reduction of parapodia, with small lobes laterally immediately below notopodial cirri. Ventral cirri constricted basally, subconical. Beginning on segment 3, setae consisting of ladder capillaries longer than acicular lobes in preacicular fascicles and capillaries $2\frac{1}{2}$ times longer than parapodial lobes with lamellae (Augener, 1912:209) in postacicular fascicles. Postacicular capillaries beginning in line parallel to long axis of body below notopodial and above neuropodial acicular lobes, smooth, line of setae curving perpendicularly and setae gradually becoming very strongly toothed in middle of bundles, then gradually less strongly toothed; middle setae with extreme proximal area of numerous, small, disorganized teeth appearing hispid, changing to row of large, loosely attached cusps, each bearing transverse rows of about 6 teeth, diminishing distally to long, flattened tips with teeth on edge.

Everted proboscis (Augener, 1912:Pl. 6, Fig. 27) with 20 longitudinal rows of fleshy papillae in rows of 4–9 covering most of distal part [Augener did not figure 2 small papillae in each row near the oral end]; papillae very short proximally, gradually lengthening distally, with some rows of 4 papillae apparently merging with one another proximally, slightly longer mid-dorsal papilla distinctly distad to others, midventral papilla absent; 10 pairs of bifurcate terminal papillae with outer bifurcations about twice longer than inner ones.

Remarks.—Specimens were received in a vial without data from the Zoologisches Museum, Hamburg, and were originally reported from both the Straits of Magellan and Chile. The large syntype has about the same number of segments, 66, and same length, 35 mm, as the largest specimen Augener reported, which was from the Straits of Magellan, but the specimen is 4 mm wide rather than 2 mm wide as he stated. The anterior fragment from which I have figured the prostomium and segment 1 (Fig. 14a) appears to be the specimen from which Augener's Fig. 27 is drawn. I have therefore indicated that the syntypes I examined came from the Straits of Magellan.

Augener's Fig. 28 of a parapodium of segment 25 may have been drawn from the large syntype, since a parapodium of that segment has been re-

moved. However, the branchiae of the large syntype are somewhat longer than his figure indicated (Figs. 14b–d).

Specimens referred to *N. magellanica* by Hartman (1938:146, 147, Fig. 62; 1940:238, Pl. 41, Figs. 100–103; 1950:100, 101; 1968:587, 588, Figs. 1–3) from southern California to Peru are apparently *N. simoni*, n. sp.

Nephtys magellanica is apparently known only from the original report of Augener (1912) based on specimens originally reported by Ehlers (1901). In a recent synopsis of the family Nephtyidae in Chile, Rozbaczylo and Castilla (1974) reported no additional specimens of the species.

Nephtys simoni, new species

Figs. 15, 16

Nephtys magellanica.—Hartman, 1938:146, 147, Fig. 62; 1944:18; 1950:100, 101; 1968:587, 588, Figs. 1–3 [not Augener, 1912].

Nephtys magellanica.—Hartman, 1940:238, Pl. 41, Figs. 100–103 [not Augener, 1912].

Nephtys buccera.—Day, 1973:43 [in part, not Ehlers, 1868].

Material examined.—FLORIDA: Hutchinson Island, Sta. II, 27°21.6'N, 80°13.2'W, about 11 m, coarse calcareous sand, holotype (USNM 58725, R. Gallagher, col., Sept. 1972), 1 paratype (FSBC I 22641); Sta. III, 27°22.0'N, 80°12.4'W, about 7 m, medium calcareous sand, 14 paratypes (AHF POLY 1292; FSBC I 22642–22646); Sta. IV, 27°20.7'N, 80°12.8'W, about 11 m, coarse calcareous sand, 7 paratypes (USNM 58726; AHF POLY 1291; FSBC I 22647–22651); Sta. V, 27°22.9'N, 80°13.9'W, about 11 m, coarse calcareous sand, 8 paratypes (FSBC I 22652–22656). NORTH CAROLINA: off Beaufort, 34°36'N, 76°28.7'W, 10 m, sand and broken shell, J. H. Day, col., 19 Apr. 1965, 43 paratypes (USNM 55684). CALIFORNIA: Balboa, sand flats, Ricketts, col., 1930, 3 specimens (USNM 35879).

Description.—Prostomium of freshly collected specimens with red spot in middle, more conspicuous in juveniles; posterior part of prostomium and middorsal part of anterior 3 or 4 segments often light golden brown, iridescent (stippled area on Fig. 15a). Length of Atlantic specimens up to 75 mm, width 3 mm, about 125 segments; Pacific specimens larger. Prostomium (Figs. 15a–e) with anterior margin convex, thin, spatulate; lateral margins irregularly rounded, broadest between lateral antennae, extending into segment 1 to nuchal organs, posterior margin with long, narrow, V-shaped, middorsal projection extending to near posterior border of segment 1; posterolateral margins concave, joining lateral margins behind nuchal organs; dorsum always with concavity exhibiting red pigment spot; lateral sides more rounded when proboscis withdrawn (Fig. 15b); middorsal posterior projection broader on juveniles (Fig. 15e). Frontal antennae attached obliquely, appearing as raised lobes originating some distance from and

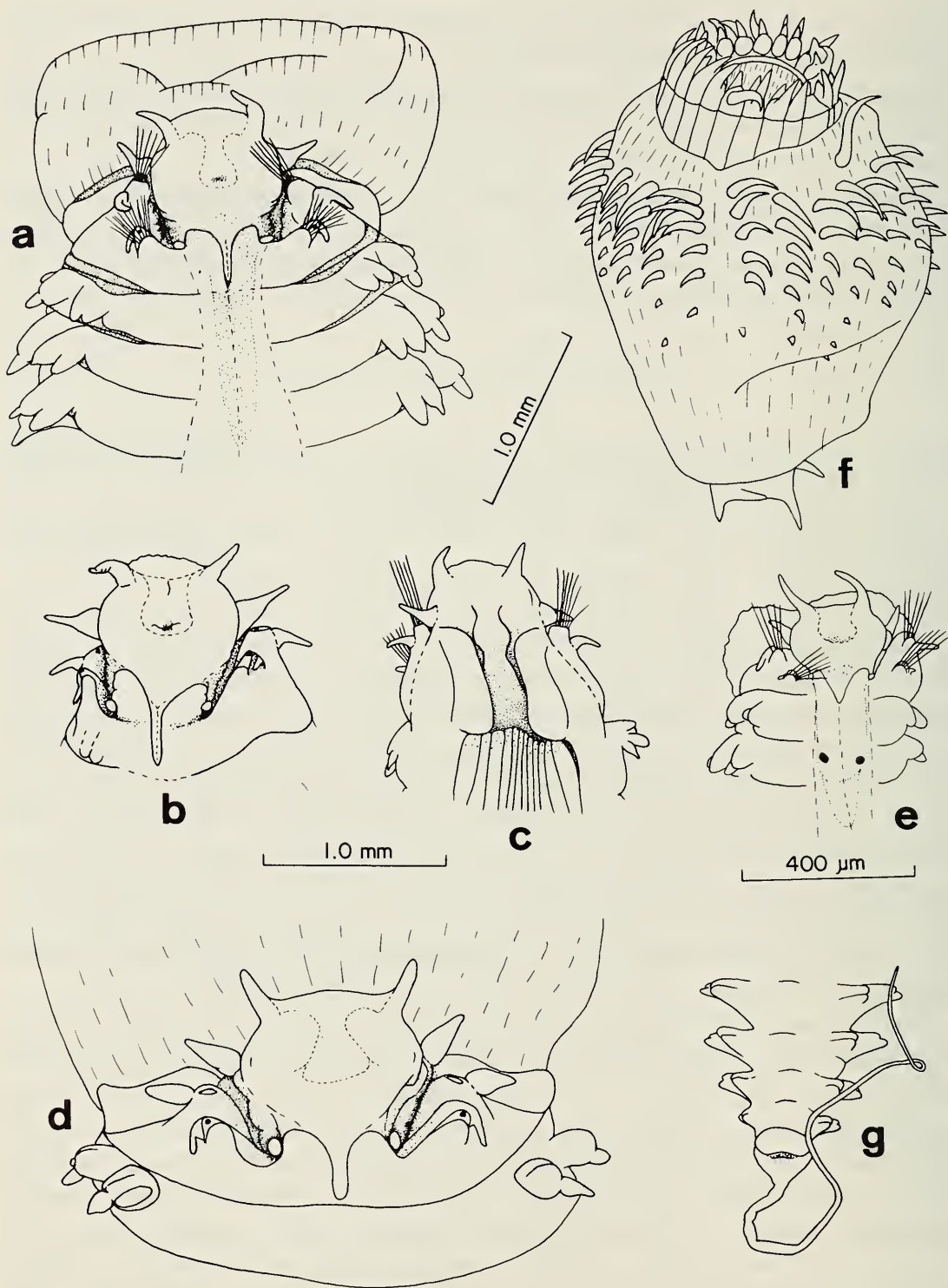


Fig. 15. *Nephtys simoni*: a, Anterior end, dorsal view, proboscis partially extended; b, Same, proboscis withdrawn; c, Same, ventral view; d, Same, dorsal view, proboscis fully extended; e, Same, dorsal view of juvenile; f, Everted proboscis, laterodorsal view; g, Pygidium, dorsal view (a, holotype; b,c, from North Carolina, USNM 55684; d, from California, USNM 35879; e, from Hutchinson Island; f,g, from Hutchinson Island, USNM 58726; g, not scaled).

fused with anterior prostomial margin, usually extending for slightly greater distance beyond. Lateral antennae originating ventrolaterally, slightly anterior to neuropodia of segment 1, slightly constricted at bases, with broad, flattened bases and narrow conical tips, slightly longer than frontal antennae on adults, shorter on juveniles. Deeply buried eyes visible on small juveniles on segment 3 (Fig. 15e), on slightly larger juveniles on segment 2, mostly not visible dorsally on adults and subadults of Atlantic specimens [visible on poorly preserved specimens], mostly visible dorsally on Pacific specimens, visible on interior part of dorsum of segment 1 when proboscis laid back on all adult specimens. Notopodia of segment 1 with pointed acicular lobes, broad presetal lobes, and short, rounded postsetal lobes (Figs. 15a, b, d, e); dorsal cirri attached to presetal lobes, short, digitate, about half as long as ventral cirri, extending posterolaterally from notopodia. Neuropodia of segment 1 on anterior segmental margin, without lobes; ventral cirri lateral to neuropodia near anterior margin of segment, similar but about half as large as lateral antennae, usually bent backward. Lobes on segment 1 covering mouth broad, almost completely visible from dorsum when proboscis everted (Figs. 15a, c, d). Notosetae of segment 1 including preacicular ladder capillaries and few smooth, slender postacicular capillaries; neurosetae smooth capillaries. Parapodia of segment 2 similar to those of following segment but without branchiae and smaller; both rami with preacicular ladder capillaries and postacicular smooth capillaries. Beginning on segment 3, parapodia similar throughout, fully developed by about segment 10 (Figs. 16a–d); both notopodial and neuropodial acicular lobes indistinctly bilobed with short lamellae below notoaciculum and above neuroaciculum, with irregular lobation above notoaciculum and below neuroaciculum; notopodial presetal lamellae shorter than acicular lobes, rounded; reduced on posterior segments; neuropodial presetal lamellae extending from upper margins of neuropodia, slightly bilobed below, shorter than acicular lobes except on anterior few segments, reduced on posterior segments; notopodial postsetal lamellae extending from segmental wall above acicular lobes, about twice as long as acicular lobes, with slight incision on upper margins, with rounded tips, gradually reduced in length posteriorly, shorter than acicular lobes on posterior segments; neuropodial postsetal lamellae extending about twice as far as acicular lobes, with pointed tips, only slightly longer than acicular lobes on posterior segments and rounded; notopodial cirri short, digitate, extending from upper margin of branchiae, similar in length throughout; branchiae occupying about $\frac{1}{3}$ of total length of parapodial margin between rami of middle segments [longer on flaccid specimens], similar in length throughout except shorter on far posterior few segments, with slight lateral bump about $\frac{1}{3}$ distance between dorsal cirri and tips. Ventral cirri constricted basally, subconical. Beginning on segment 3 and continuing to posterior end, setae consisting of ladder

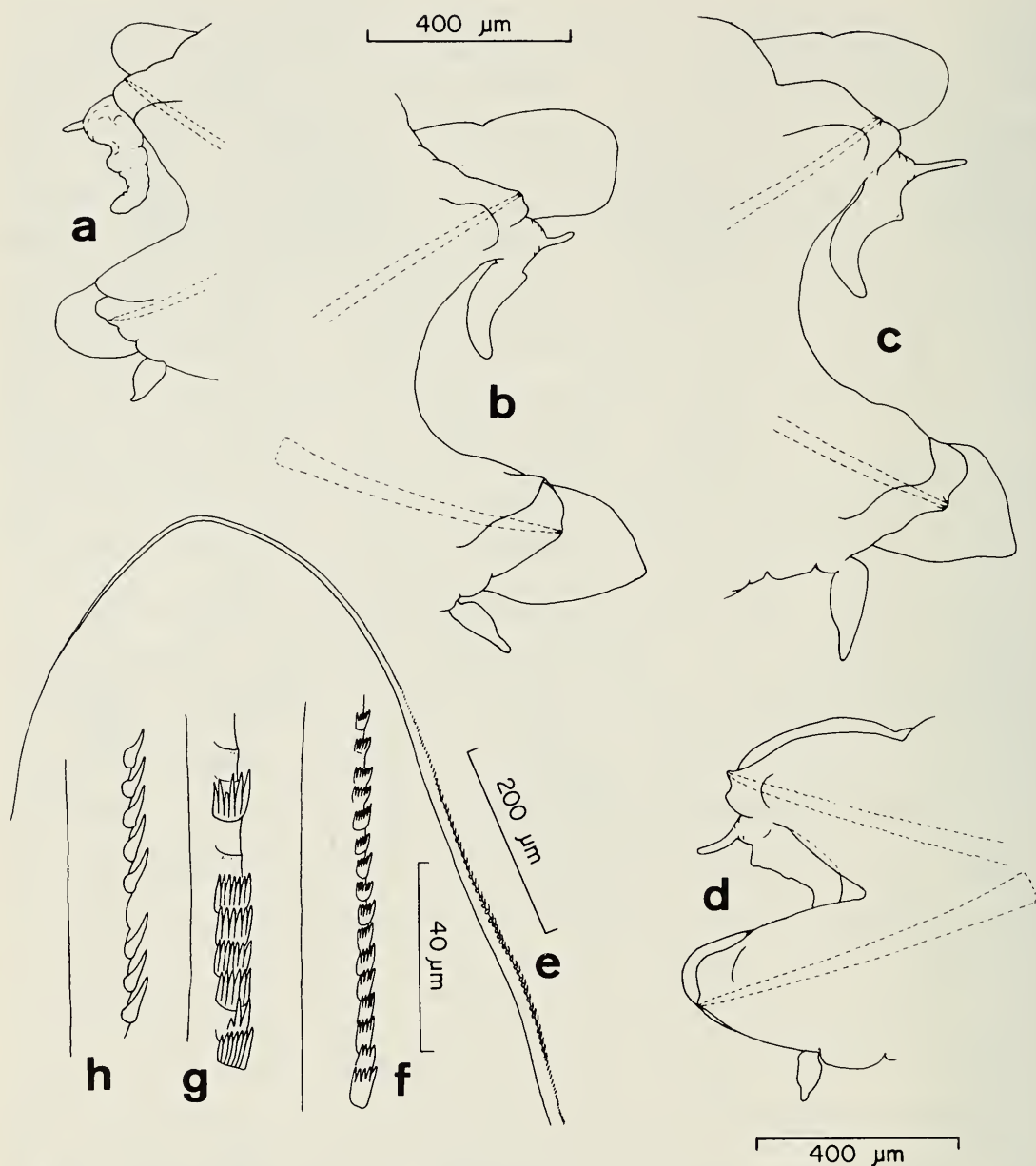


Fig. 16. *Nephtys simoni*, holotype: **a**, Parapodium from segment 3, anterior view; **b**, Same, from segment 10; **c**, Same, from segment 23; **d**, Same, from segment near posterior end; **e**, Long, toothed capillary seta from middle segment; **f-h**, Basal parts of same, magnified (**g**, **h**, not scaled).

capillaries longer than acicular lobes in preacicular fascicles and toothed capillaries about twice as long as total length of parapodia between smoother capillaries above and below; postacicular capillaries of lower parts of notopodial fascicles and upper parts of neuropodial fascicles, respectively, aligned parallel to long axis of body above and below acicular lobes and entirely smooth; postacicular strongly toothed capillaries with extreme proximal

area of numerous, small, disorganized teeth appearing hispid, changing slightly more distally to row of large loosely attached cusps, each bearing transverse row of 5–6 teeth diminishing distally (Figs. 16e–h); postacicular capillaries above and below strongly toothed ones, except as noted above, gradually with smaller teeth. Setae of about setiger 25: 10 preacicular notopodial capillaries, 22–25 postacicular capillaries; 17 preacicular neuropodial capillaries, about 22 postacicular capillaries. Pygidium (Fig. 15g) anteriorly cylindrical, posteriorly flattened, triangular, with dorsal anus and slender median anal cirrus as long as last 10 segments.

Everted proboscis (Fig. 15f) with proximal $\frac{1}{3}$ smooth or wrinkled; distal $\frac{2}{3}$ with 22 longitudinal rows of 4–8 fleshy papillae, very short proximally, gradually lengthening distally, with some rows of 4 and 5 papillae apparently merging with one another proximally, slightly longer middorsal papilla distinctly distad to others, midventral papilla subequal to other papillae and only very slightly more distad; 11 pairs of bifurcate terminal papillae encircling opening, with longer branches on outer side; sides separated by low middorsal and midventral mounds. Internal pair of triangular-pyramidal, horny jaws.

Remarks.—The numerous specimens from North Carolina (USNM 51095) referred to *N. bucera* Ehlers by Day (1973:43) were examined and found to be a mixture of species. Of these, 17 small specimens agree with *N. bucera*, a species with lateral antennae not visible dorsally, lacking a posterior prostomial projection, and with teeth of postacicular setae entire rather than expressed as multidentate cusps; 13 small specimens are referred to *Nephtyidae* sp. (USNM 55685) and may be the young of *N. picta* Ehlers; the remaining 43 are considered to be *N. simoni* (USNM 55684, paratypes).

Nephtys simoni is very similar to *N. magellanica* Augener, from the Straits of Magellan and Chile. The prostomium of the latter is very robust, with a short, broad dorsoposterior projection; lateral antennae are subconical and subequal to ventral cirri of segment 1; and branchiae are long and cover about $\frac{2}{3}$ of the length between rami.

Specimens from Balboa, California, identified by the Berkeleys as *N. magellanica* (USNM 35789) are *N. simoni*. Specimens reported as *N. magellanica* from eastern Pacific areas ranging from southern California to Peru by Hartman (cited in synonymy) are apparently also *N. simoni*, although the prostomium she figured is somewhat different (Hartman, 1938:Fig. 62a; 1940:Pl. 41, Fig. 100). The specimens reported by Hartman (1944:18) from Venezuela and Colombia (Atlantic side) are probably also the same species.

Other specimens reported as *N. magellanica* from Seahorse Key (Taylor, 1961:103, 104; USNM 33330) and Tampa Bay (Taylor, 1971:285–287; USNM 45582), Florida, and the Chesapeake Bay area, Virginia (Wass, 1965:16; USNM 33326–33329, 38738) were examined and found to be a species similar to *N. hombergi* Savigny, 1818; they differ from *N. hombergi* in not

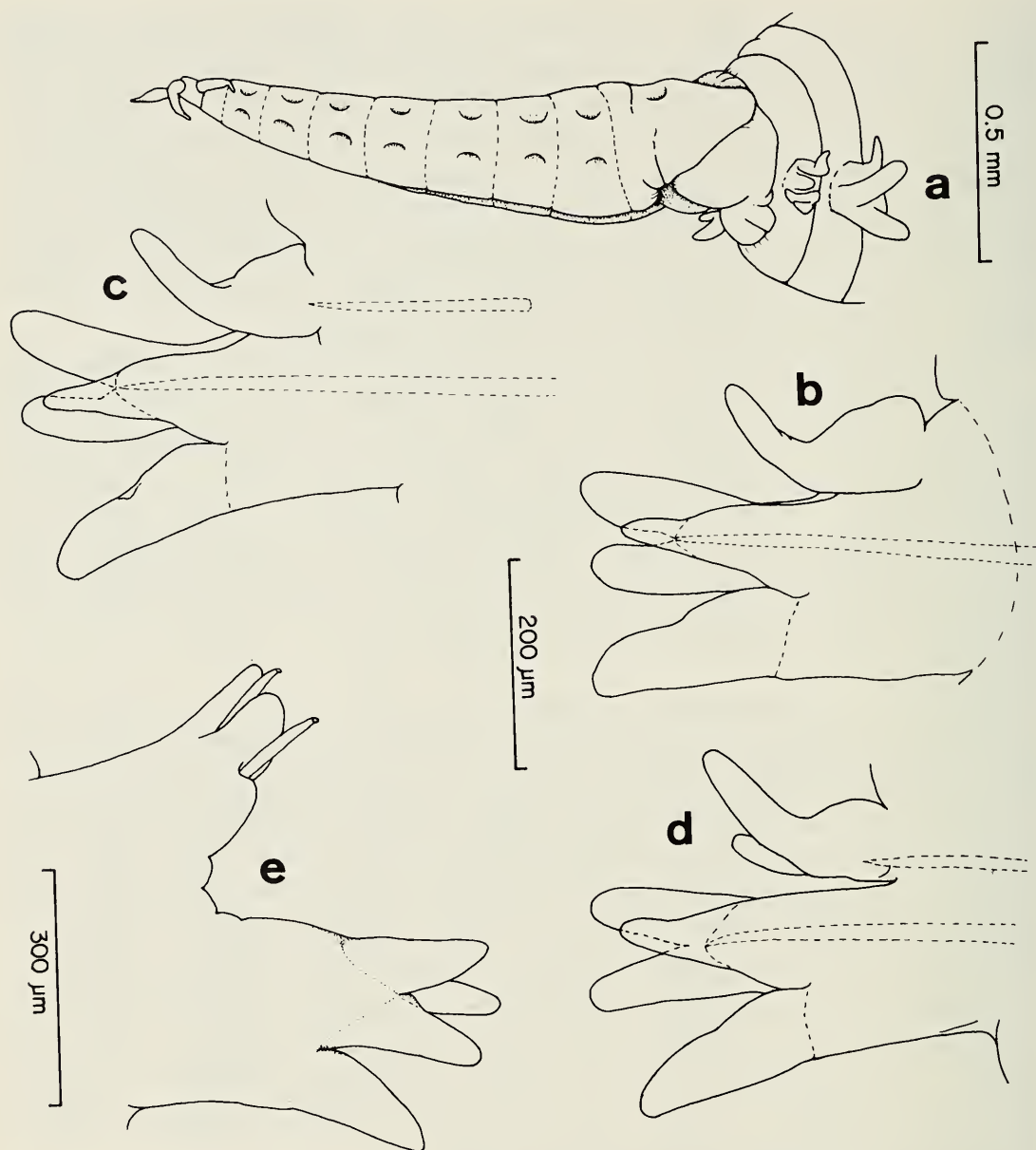


Fig. 17. *Goniada multidentopsis*, holotype: **a**, Anterior end, lateral view; **b**, Parapodium from setiger 30, posterior view; **c**, Parapodium from setiger 41, posterior view; **d**, Parapodium from setiger 64, posterior view; **e**, Parapodium from setiger 102, anterior view.

having dorsal cirri on segment 1. Specimens of *Nephtys* cf. *hombergi* could easily be misidentified as *N. simoni* since the prostomium is similar and has a red pigment spot; however, postacicular setae have subproximal teeth which are very large but entire.

Etymology.—The species is named for Dr. Joseph L. Simon of the University of South Florida, an outstanding teacher whose research and that of his students has contributed significantly to our knowledge of estuarine invertebrate fauna.

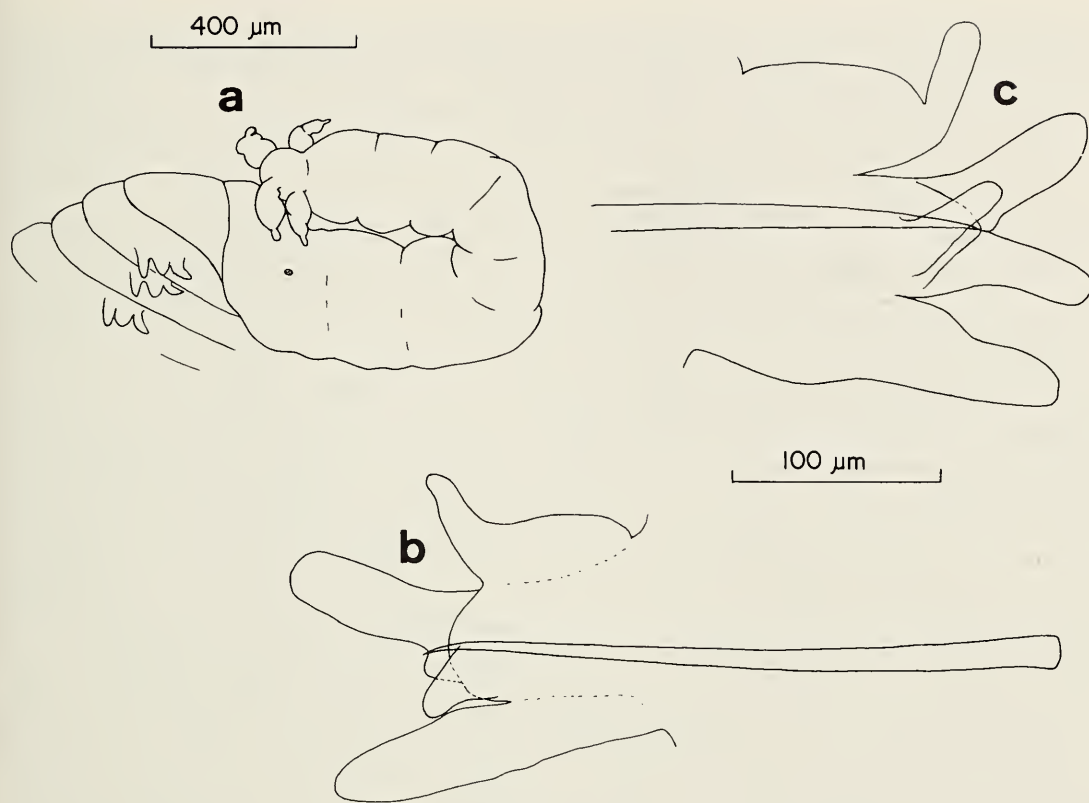


Fig. 18. *Goniada multidentopsis*, paratype: a, Anterior end, twisted; b, Parapodium from setiger 10, posterior view; c, Same, from setiger 26, posterior view.

Goniadidae Kinberg

Goniada Audouin and Milne Edwards

Goniada multidentopsis, new species

Figs. 17–19

Material examined.—FLORIDA: Hutchinson Island, Sta. V, 27°22.9'N, 80°13.9'W, about 11 m, coarse to very coarse calcareous sand, N. Whiting et al., cols., Mar. 1979, holotype (USNM 58753); Sta. III, 27°22.0'N, 80°12.4'W, about 7 m, medium calcareous sand, R. Gallagher, col., Jan. 1972, immature paratype (USNM 58754).

Description.—Prostomium and anterior few segments uncolored; remainder with brown pigmented areas; anterior and middle segments with fusi-form middorsal spot, large rectangular area above parapodia, small spot below parapodia, dark midventral line, parapodia moderately pigmented; pigment diminishing in midregion; posterior segments, beginning on setiger 86–87 of holotype and setiger 55 of smaller paratype, with pigment pattern similar to that of more anterior segments but much darker, with additional 2 small, prominent spots midventrally on each segment at intersegmental

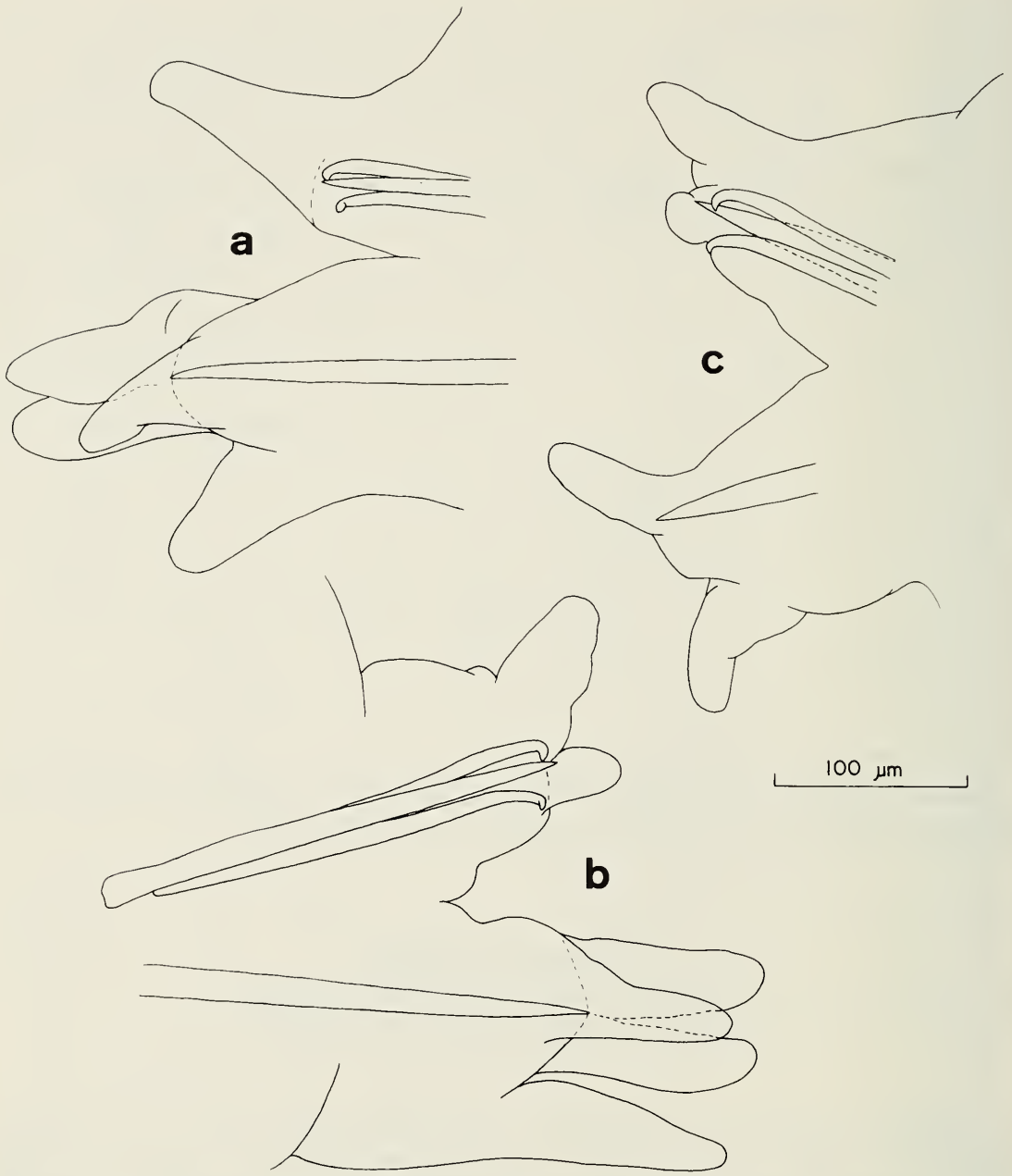


Fig. 19. *Goniada multidentopsis*, paratype: **a**, Parapodium from setiger 45, posterior view; **b**, Same, from setiger 62, posterior view; **c**, Posterior parapodium, anterior view.

grooves and segments becoming banded ventrally. Holotype of about 130 segments, incomplete posteriorly, 50 mm long, 1.8 mm wide with parapodia at about setiger 30, 1.9 mm wide with parapodia at about setiger 100, anterior and middle segments slightly flattened, posterior segments more cylindrical with longer parapodia; smaller, complete paratype of 105 segments, 43 mm long, 1 mm wide with parapodia. Prostomium (Figs. 17a, 18a) with 9–10 indistinct rings including basal and terminal rings; anterior ring with 2 pairs

of subequal, biarticulate antennae, basal articles long, broad on paratype, partially dried on holotype, dorsolateral pair attached proximally on terminal ring, ventrolateral pair attached distally; basal ring with pair of deeply embedded eyespots, with pair of semicircular depressions above eyes on holotype; rings 2–8 of holotype with 2 pairs of similar depressions in opposition on lateral sides; depressions possibly sensory in function. Peristomium visible ventrolaterally and ventrally, forming lateral and posterior margins of mouth, possibly visible dorsally between lateroposterior extensions of prostomium (Figs. 17a, 18a). Parapodia of holotype uniramous for anterior 62 setigers, but with notoacacula beginning between setigers 35 and 41 (Figs. 17b, c); subbiramous to setiger 86 (Fig. 17d), with last 3 segments transitional but without notosetae; and fully-developed biramous thereafter (Fig. 17e). Parapodia of smaller, immature paratype with uniramous parapodia for anterior 40 setigers and fully-developed biramous parapodia beginning on setiger 55 (Figs. 18c, d, 19). Anterior 2 setigers of holotype (Fig. 17a) with dorsal cirri, single, presetal neuropodial lobes in supraacicular position and extending farther than ventral cirri, rounded neurosetal lobes, and ventral cirri; second presetal neuropodial lobe developing below aciculum on setiger 4; and postsetal neuropodial lobe developing on setiger 6, neuropodial lobes fully developed by setiger 15. Parapodium of setiger 30 of holotype (Fig. 17b) with dorsal cirrus constricted basally, with bulbous base and cylindrical tip, not extending as far as parapodial lobes and ventral cirrus; presetal neuropodial lobes long, flattened, parallel-sided, with rounded tips; neuropodial postsetal lobe shorter than presetal lobes, subtriangular; slightly pointed neurosetal lobe, with slender, pointed aciculum; ventral cirrus fused on basal half with neuropodium, with distal half indistinctly separated from base. Uniramous parapodia with slender, pointed notoacacula extending into bases of dorsal cirri beginning between setigers 35 and 41 of holotype (Fig. 17c) with dorsal cirri slightly longer than on more anterior parapodia. Subbiramous parapodia of middle region of holotype (Fig. 17d) with club-shaped to rounded notopodial lobes anteroventrally on dorsal cirri; dorsal cirri longer, more slender, less constricted basally than on more anterior parapodia; and presetal neuropodial lobes extending farther than postsetal lobes and ventral cirri. Fully-formed biramous parapodia of holotype (Fig. 17e) stouter, longer than those of midregion, with rami well separated, with mostly embedded, hook-tipped, acicular notosetae, singly above and below notopodial lobes; notopodial lobes stout, round-tipped, extending as far as dorsal cirri, with stout, pointed aciculum, extending into bases; neuropodia with stout, subtriangular, presetal and postsetal lobes longer than ventral cirri; ventral cirri similar to those of middle segments but stouter. Anterior uniramous parapodia of paratype (Figs. 18b, c) developing neuropodial postsetal lobe by about setiger 14, fully developed by about setiger 25. Paratype with region of “transitional” parapodia on setig-

ers 41–54 (Fig. 19a); notopodia of transitional region with dorsal cirri but without notopodial lobes, with single aciculum and 2 nonemergent notosetae in bases of dorsal cirri. Fully-formed biramous parapodia of paratype (Fig. 19b) beginning on setiger 55, with notopodial lobe smaller than on holotype. Parapodium of far posterior segment of paratype (Fig. 19c) with notopodial lobe further reduced and only upper presetal neuropodial lobe remaining. All neurosetae compound, heterogomph spinigers with denticulate blades tapered to thin tips, with teeth longer proximally, diminishing in length distally.

Proboscis of holotype long, with about 80 chevrons on each side extending to near maxillary end; chevrons larger after first few, closely spaced near oral end, smaller and more widely spaced near maxillary end. Proboscical papillae of one type, broad, flattened, flanged, with slightly beaked tips and central pores. Macrognaths with 4 teeth, larger dorsally, decreasing in size ventrally; two rows of micrognaths; dorsal arc with 8 large H- or X-shaped pieces in posterior row, 9 small H- or X-shaped pieces between large pieces in anterior row; ventral arc with pieces subequal to those of dorsal arc, with 5 large pieces in posterior row and 6 small ones. Proboscis of paratype with about 50 chevron pairs, one small and 7 large micrognaths in dorsal arc, 5 large micrognaths in ventral arc.

Remarks.—*Goniada multidentopsis* is similar to *G. multidentata multidentata* Arwidsson (1899:45, 46, Pl. 3, Figs. 40–42, Pl. 4, Fig. 63), from West Africa, and *G. multidentata* var. *indica* Monro (1937:284, 285, Text Fig. 11), from the Gulf of Aden and the Persian Gulf, in having numerous chevrons along each side of the proboscis. *G. multidentopsis* differs in having a body composed of three distinct regions instead of two and notosetae with hooked tips instead of pointed notosetae on middle and posterior segments. *G. multidentata* has about 90 chevron pairs on the proboscis, larger macrognaths with 12 teeth and 42 micrognaths, while var. *indica* has only 45 chevron pairs, macrognaths with 6 teeth and 26 micrognaths. Both *G. multidentata* and var. *indica* have 36 anterior uniramous segments, and the latter has 8 transitional segments, after which both have fully-formed biramous parapodia.

Etymology.—The specific name is derived from the previously described species, *multidentata*, and the Greek suffix, *-opsis*, meaning likeness, and refers to the similarity between the two species.

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